

Change 14  
NHB 5500.1A

**PETITIONS FOR PATENT WAIVERS**

**NHB 5500.1A**

**CHANGE 14**

December 1978

1. Additional Inventions and Contributions Board Findings of Fact and Recommendations on Waiver Petitions made under the 1966, 1972, and 1977 Patent Waiver Regulations digested.
2. Additional Inventions and Contributions Board Actions for Petitions Deferred.
3. List of Patent Waiver Petitions for which Findings of Fact have not been digested.
4. Remove pages i, iii, li, liii-lviii, b-1, b-2, b-35 through b-39, c-1 through c-14, I-1 through I-28 and insert the attached sheets in numerical order.

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(NASA-TM-79964)\* PETITIONS FOR PATENT  
WAIVERS: FINDINGS OF FACT AND  
RECOMMENDATIONS OF THE NASA INVENTIONS AND  
CONTRIBUTIONS BOARD (National Aeronautics  
and Space Administration) 103 F

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Unclas  
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## PREFACE

December 1978


This publication sets forth the Finding of Fact and Recommendations of the NASA Inventions and Contributions Board concerning selected petitions for waiver of rights by the United States to inventions made or that may be made in the performance of work under contracts with the National Aeronautics and Space Administration, as determined by the Administrator pursuant to 42 U.S.C. 2457(f).

In addition, lists of those petitions for which Findings of Fact are not digested in this publication, and of those on which action has been deferred by the Board, are included.

To assist you in locating requests for waivers on which Findings of Fact and Recommendations have been made and digested, the waiver cases are identified in this publication by:

1. The year in which the applicable NASA Patent Waiver Regulations became effective,
2. Name of Petitioner,
3. Number of the contract or Request for Proposal,
4. Description of Contract or Invention,
5. Headnotes of the salient issues raised by the Petition,
6. Rationale used by the Inventions and Contributions Board in arriving at its recommendation.

At least annually, additional Findings of Fact and Recommendations of the NASA Inventions and Contributions Board on new petitions will be published as supplements to this Handbook. The public may obtain copies of this publication from the National Technical Information Service, 5285 Port Royal Road, Springfield, Va. 22161. When ordering cite the following number: PB 289-615. Price: North America—\$6.00, Foreign—\$12.00.

  
Frederick J. Lees  
*Chairman,*  
*Inventions and Contributions Board*

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<sup>1</sup> Domestic rights only.

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## NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

PETITIONER: California Institute of Technology  
INVENTION: Automated Mass Spectrometer Analysis  
DECISION: Petition GRANTED, Domestic Rights

## SUBPART 1245.1, NASA Patent Waiver Regulations (1972)

**PUBLIC HEALTH SECTION 1245.105(b)(3)—Mass spectrometer to provide biomedical analysis of fluids at low cost.**

**WAIVER AS NECESSARY INCENTIVE—Aggressive licensing efforts resulted in requests for licenses to practice the invention by several companies; waiver is found as necessary to call forth risk capital for development and marketing; waiver provides assurance of early product introduction in the marketplace.**

**FINDINGS AND RECOMMENDATION OF THE INVENTIONS AND CONTRIBUTIONS BOARD:**

The petitioner, California Institute of Technology, is a contractor of the National Aeronautics and Space Administration under contract NAS 7-100. The petition was made for waiver of domestic rights of the United States in the invention described below. The invention was made in the performance of work required under the above-identified contract and in the manner specified in section 305(a) of the National Aeronautics and Space Act of 1958 as determined by the Administrator. The petition was considered by the Inventions and Contributions Board on September 30, 1977.

The Board, having considered the allegations and claims of the petitioner, is unable to make all of the findings required under section 1245.105(b) of the NASA Patent Waiver Regulations (1972). In particular, pursuant to section 1245.105(b)(3) of the Regulations, the invention is found to directly concern the public health. The Board, however, recommends grant of waiver of domestic rights as provided by section 1245.105(c) of the Regulations on its further finding that waiver is a necessary incentive to call forth risk capital and expense to bring the invention to the point of practical application. The Board's findings of fact and recommendation are set forth below.

The invention relates to an automated focal plane mass spectrometer analysis system. In this system, small volumes of volatilizable samples are automatically analyzed to simultaneously determine each sample's components and their abundances with a high degree of accuracy, with minimum operator attention, and with a high sample completion rate. Each of the samples is analyzed in a double focusing mass spectrometer whose output is in the form of separate ion beams, all of which are simultaneously focused

in a focal plane. Each ion beam is indicative of a different sample component or different fragments of one or more sample components, and the beam intensity is related to the relative abundance of the sample component. The system also includes an electro-optical ion detector which automatically and simultaneously converts the ion beams into electron beams which in turn produce a related image which is transferred to the target of a vidicon unit. The latter converts the images into electrical signals which are supplied to a data processor. The system is under the control of a master control unit, which in addition to monitoring and controlling various power sources, controls the automatic operation of the system.

The automated mass spectrometer provides low cost capability for paramedical analysis in the clinical laboratory. For example, an amino acid analysis currently costs in excess of \$100 and requires 6 to 8 hours of analytical time. The subject mass spectrometer system is envisaged to provide the same analysis in about 1 minute. The invention therefore may strongly impact in the area of clinical analysis and biomedical research. The extreme sensitivity provided by the system appears to be unachievable by any other available technique. In view of the above, the Board finds pursuant to section 1245.105(b)(3) of the Waiver Regulations that the invention directly concerns the public health, public safety, or public welfare.

The Board, having considered the relationship of the invention to the health, safety, and welfare of the general public, nevertheless finds pursuant to section 1245.105(c) of the Regulations that waiver is a necessary incentive to call forth risk capital and expense to bring the invention to the point of prac-

tical or commercial application. Petitioner is not a manufacturing concern and therefore intends to transfer this technology to the public sector by licensing others to practice the invention. As a result of its licensing efforts to date, petitioner has received requests for licenses from several companies, one of which is prepared to invest a large sum of money for commercialization of the mass spectrometer. Petitioner expects that its licensing negotiations will be completed shortly so that commercial development of the invention should be underway by the licensee at an early time.

Petitioner is deemed best able to license this invention inasmuch as it has received earlier waiver to

an optical detector device which is a component of the subject automated mass spectrometer. Licensing of the inventions together provides the assurance that a mass spectrometer system would be developed in the best mode of operation, since a licensee would have proprietary rights to all essential components of the system. Waiver of rights therefore is found to be a necessary incentive to call forth risk capital and expense to bring the invention to the point of practical or commercial application at an early time.

The Board concludes that the interests of the United States would best be served by waiver of rights, and recommends that the petition for waiver of domestic rights be GRANTED.



## NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

PETITIONER: California Institute of Technology  
 INVENTION: Bag for Storing Whole Blood  
 DECISION: Petition DENIED, Domestic Rights

## SUBPART 1245.1, NASA Patent Waiver Regulations (1972)

**PUBLIC HEALTH SECTION 1245.105(b)(3)—Method of storing whole blood may extend shelf life and promote efficient utilization of a vital resource.**

**WAIVER AS NECESSARY INCENTIVE—Plans and intentions of petitioner do not establish that the invention will be made available to the public at an early time.**

## FINDINGS AND RECOMMENDATION OF THE INVENTIONS AND CONTRIBUTIONS BOARD:

The petitioner, California Institute of Technology, is a contractor of the National Aeronautics and Space Administration under contract NAS 7-100. The petition was made for waiver of domestic rights of the United States in the invention described below. The invention was made in the performance of work required under the above-identified contract and in the manner specified in section 305(a) of the National Aeronautics and Space Act of 1958 as determined by the Administrator.

The petition was considered by the Inventions and Contributions Board on March 7, 1978. The Board, having considered the allegations and claims of the petitioner found that the invention is of the type for which waiver is proscribed by section 1245.105(b)(3) and section 1245.105(c) of the NASA Patent Waiver Regulations (1972). Specifically, the Board found pursuant to section 1245.105(b)(3) of the Regulations that the invention directly concerns the public health. In addition, petitioner did not show to the Board's satisfaction that waiver is a necessary incentive to call forth risk capital and expense to bring the invention to the point of practical application as required by section 1245.105(c).

Petitioner, having been promptly notified of the Board's adverse findings, did not request reconsideration within the time period set by the Board. The Board's findings and recommendation are set forth below.

The invention relates to an improved blood storage bag which extends the shelf life of buffered blood. It is known that sodium bicarbonate ( $\text{NaHCO}_3$ ) added as a buffer to whole blood maintains a desired pH level during storage. By the addition of such a buffer, blood can be preserved with good viability for about 42 days. However, the buffer releases  $\text{CO}_2$  during storage which, if not removed at a controlled rate, causes the pH of the blood to change to a value which rapidly damages the blood. Storage of

blood in conventional blood bags in which the buffer is added does not show an increase in the storage life due to the uncontrolled  $\text{CO}_2$  release. The subject invention utilizes a medically approved plastic PVC material for blood bags, and by a novel design, permits the diffusion of  $\text{CO}_2$  from the bag at a controlled rate; it also provides sufficient strength to withstand rough handling of the bag without being ruptured. More particularly, the bag is of waffle-type construction having thin (6 mils) and thick (50 mils) regions. It is through these thinner regions that the  $\text{CO}_2$  (slowly) diffuses to the atmosphere. Application of the invention will promote the efficient and economical utilization of our national blood resource. Accordingly, the Board finds, pursuant to section 1245.105(b)(3) of the Patent Waiver Regulations, that the invention directly concerns the public health.

The Board is unable to find under section 1245.105(c) of the Patent Waiver Regulations that waiver is a necessary incentive to call forth risk capital and expense to bring the invention to the point of practical application. Petitioner's plans and intentions do not establish that waiver would materially advance the development of the invention, or that the invention will be worked at the earliest practicable time. The Board is advised by petitioner that it is not likely to continue its efforts to license the practice of the invention in view of the lack of interest on the part of those companies that it has already contacted. Moreover, petitioner has not indicated what other action it would take to solicit support toward further development of the invention so that its benefits would be made available to the public at an early time.

The Board concludes that the interests of the United States would not be served by waiver of rights, and recommends that the petition for waiver of domestic rights be DENIED.



**NATIONAL AERONAUTICS AND SPACE ADMINISTRATION**

**PETITIONER:** University of Wisconsin  
**INVENTION:** Design for Joint Prosthesis for Interfacial Stability  
**DECISION:** Petition GRANTED, Domestic Rights

**SUBPART 1245.1, NASA Patent Waiver Regulations (1972)**

**PUBLIC HEALTH SECTION 1245.105(b)(3)—Implantable hip joint is found to directly concern public health.**

**WAIVER AS A NECESSARY INCENTIVE SECTION 1245.105(c)—Petitioner will work with licensees to develop the invention and conduct testing for FDA approval.**

**FINDINGS AND RECOMMENDATION OF THE INVENTIONS AND CONTRIBUTIONS BOARD:**

The petitioner, University of Wisconsin, is a contractor of the National Aeronautics and Space Administration under contract NAS 5-23500. The petition was made for waiver of domestic rights in the invention described below. The invention was made in the performance of work required under the above-identified contract and in the manner specified in section 305(a) of the National Aeronautics and Space Act of 1958 as determined by the Administrator. The petition was considered by the Inventions and Contributions Board on October 25, 1977.

The Board, having considered the allegations and claims of the petitioner, is unable to make all of the findings under section 1245.105(b) of the NASA Patent Waiver Regulations (1972). Specifically, the invention is found to be of the type proscribed by section 1245.105(b)(3) of the Waiver Regulations as it directly concerns the public health. However, pursuant to section 1245.105(c) of the Regulations, the Board finds that the public interest would best be served by waiver of rights. The Board's findings of fact and recommendation are set forth below.

The invention relates to an improved joint prosthesis for providing better interfacial stability, improved load transfer, and improved cement bonding. This hip replacement design overcomes loosening of the implant because of improved stability through maximum contact area, even distribution of stresses, no direct contact between cement and bond, and long-term stability by ingrowth of the bone into the pores of a polymer sheath which is inserted within the bone structure. The even distribution of forces that occur at the cement-sheath-bone interface maximizes contact area, thus preventing high stress concentration points. The invention was developed under a NASA program which was directed to the application of aeronautical and space technology to biomedicine. The University of Wisconsin is one of

several biomedical application teams under contract with NASA to transfer space technology to the private sector. Accordingly, the Board finds pursuant to section 1245.105(b)(3) of the Waiver Regulations that the invention directly concerns the public health.

The Board, having considered the relationship of the invention to the public health, nevertheless finds under section 1245.105(c) of the Waiver Regulations that waiver is a necessary incentive to call forth risk capital and expense to bring the invention to the point of practical application. Petitioner is not a manufacturing concern and therefore intends to transfer the technology of the invention to the public sector by licensing others to practice the invention. To this end, petitioner has contacted several manufacturers, two of which have expressed an interest in funding further development of the prosthesis design concept. Petitioner has not entered into negotiations with such companies in view of the indeterminate nature of the waiver status for the invention; however, on grant of waiver, petitioner intends to negotiate licenses with these companies in order to achieve early commercialization of the invention. Petitioner's plan is to seek strong financial backing from a manufacturer to construct the device and carry out the required clinical testing. The University of Wisconsin's role in this process will be to coordinate and facilitate the commercialization process and to supply such technical expertise as is needed to bring the invention to the point of practical application. Under petitioner's continued efforts to prove the feasibility of the design concept, it has identified an ion bombardment technique which was perfected at the NASA Lewis Research Center and which appears to solve one of the major problems of implants. This technique which uses ion beams produces micropores in the sheath component of the prosthesis permitting the

tissue to fill such pores, thus producing a tight and permanent attachment. A significant expenditure of funds is required to further develop the prosthesis design, including testing for FDA approval. Such investment is not likely to occur unless petitioner acquires proprietary commercial rights in the invention.

On grant of the waiver, the University of Wisconsin will assign the rights to the invention to the Wisconsin Alumni Research Foundation whose responsibility is to solicit licenses and to conduct licensing negotiations. The foundation has been associated with the university since 1925 for the purpose of licensing university inventions. The foundation has full-time personnel involved in invention development and licensing activities. The policy of the foundation is to grant licenses which will result in the broadest distribution of products embraced by the invention. Exclusive licenses are granted only when substantial development work must be completed before the invention can be brought to production for distribution to the public and when such license, for at least a limited period, is necessary to

induce the licensee to undertake the development work. The policy of the foundation, however, is to grant nonexclusive licenses. Licenses are granted on the basis of reasonable royalties consistent with the normal trade practice. The inventor is awarded a percentage of net royalties and the balance turned over to the University of Wisconsin for scientific investigation and research.

NASA has evaluated the program out of which the invention arose and considers the project complete. Thus, no further Government funding will be provided for development of the invention. Waiver of rights would accordingly provide the incentive for petitioner to continue its own efforts to obtain patent coverage at its own expense and to license the invention so that its benefits might be made available to the public at an early date.

The Board concludes that the interests of the United States would best be served by waiver of rights to this invention, and recommends that the petition for waiver of domestic rights be GRANTED.

## NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

PETITIONER: United Technologies Corporation  
 INVENTION: High Impact Strength Silicon Nitride  
 DECISION: Petition GRANTED, Domestic Rights

## SUBPART 1245.1, NASA Patent Waiver Regulations (1972)

**PUBLIC WELFARE SECTION 1245.105(b)(3)—Strong relationship found in support of the national energy program where invention improves gas turbine efficiency.**

**WAIVER AS NECESSARY INCENTIVE—R. & D. to continue under privately funded company program.**

## FINDINGS AND RECOMMENDATION OF THE INVENTIONS AND CONTRIBUTIONS BOARD:

The petitioner, United Technologies Corporation, is a contractor of the National Aeronautics and Space Administration under contract NAS 3-19731. The petition was made for waiver of domestic rights of the United States in the invention described below. The invention was made in the performance of work required under the above-identified contract and in the manner specified in section 305(a) of the National Aeronautics and Space Act of 1958 as determined by the Administrator. The petition was considered by the Inventions and Contributions Board on October 25, 1977.

The Board, having considered the allegations and claims of the petitioner, is unable to make all of the findings required under section 1245.105(b) of the NASA Patent Waiver Regulations (1972). In particular, pursuant to section 1245.105(b)(3) of the Regulations, the invention is found to directly concern the public welfare. The Board, however, recommends grant of waiver of domestic rights as provided by section 1245.105(c) of the Waiver Regulations on its further finding that waiver is a necessary incentive to call forth risk capital and expense to bring the invention to the point of practical or commercial application. The Board's findings and recommendation are set forth below.

The invention relates to a process for improving the impact resistance of ceramics such as hot pressed silicon nitride. By this process, porous silicon nitride layers are formed on dense silicon nitride for improved impact strength. The process for making such layers comprises mixing silicon powder with silicon nitride powder and water and nitriding the powder at 1,350° C for about 8 hours. As a result, an extremely strong and porous coating is achieved. The invention is expected to find application in the production of aircraft gas turbine engine vanes and blades.

NASA has determined that there is a direct relationship of the invention to the national energy program. The higher the operating temperature in a gas turbine, the higher the efficiency. Ceramics, such as the carbide and nitride of silicon, have the potential of exceeding the useful operating temperatures of metal turbine components. Ceramics are therefore receiving much attention today for gas turbine applications, whether they are for aircraft, automotive, or stationary power plants. Ceramics, however, have one disadvantage in that they are brittle and poor in impact resistance. Energy absorbing layers is one of the several concepts being examined by NASA and its contractors to minimize the brittleness problem. As such, the concept of the inventions may have a significant impact on the national energy program. The Board therefore finds pursuant to section 1245.105(b)(3) of the Waiver Regulations that the invention directly concerns the public welfare.

The Board, having considered the relationship of the invention to the national energy program, finds pursuant to section 1245.105(c) of the Regulations that waiver is a necessary incentive to call forth risk capital and expense to bring the invention to the point of practical or commercial application. Further development work of the invention is required to produce a ceramic turbine blade or vane which is strong, impact resistant, and suitable for use in gas turbine engines. For example, rates of conversion, temperatures of processing, and examination of phase ratios are being explored by petitioner. One of petitioner's divisions is involved in research on ceramic blades and forming attachments so that continued development of the invention would suitably interface with the experience it has already obtained. Petitioner estimates that because of the unique problems of ceramic blades and vanes, wide use of such materials in aircraft, power generation

and ground vehicles may not occur for a decade. Petitioner, however, stands ready to market or license the invention should a demand for the coating arise. Based on petitioner's plans and projections, a major part of the program funding for the development of silicon nitride for improved toughness will be supported by petitioner. Petitioner points out that in 1976 it had expended \$10,000 on this concept, and in 1977, petitioner's support for the program has been at the rate of \$100,000 per year. On grant of waiver, petitioner will continue

to explore the concept of the invention at the same or faster rate. Waiver of rights would provide the incentive for petitioner to continue its efforts of development in the interest of achieving low cost, high impact blades and vanes.

The Board concludes that the interests of the United States would best be served by waiver of rights, and recommends that the petition for waiver of domestic rights be GRANTED.

## NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

PETITIONER: Stanley J. Rusk  
 INVENTION: Commutated Data Record Circuit  
 DECISION: Petition GRANTED, Domestic Rights

## SUBPART 1245.1, NASA Patent Waiver Regulations (1972)

**WAIVER TO A COINVENTOR**—Waiver may be granted to one of two coinventors where the other inventor disclaims his interest in obtaining waiver.

## FINDINGS AND RECOMMENDATION OF THE INVENTIONS AND CONTRIBUTIONS BOARD:

The petitioner, Stanley J. Rusk, has requested waiver of domestic rights to an invention that relates to a method of pulse modulating data for tape recording. The invention, described below, was made by petitioner and Robert J. Fujimoto while employed by Lockheed Missile and Space Company, Incorporated, a contractor of the National Aeronautics and Space Administration under contract NAS 2-6573. The invention was made in the performance of work required under the above-identified contract and in the manner specified in section 305(a) of the National Aeronautics and Space Act of 1958 as determined by the Administrator. The petition was considered by the Inventions and Contributions Board on October 25, 1977.

The Board, having considered the allegations and claims of the petition, makes the findings required under section 1245.105(b) of the NASA Patent Waiver Regulations (1972). The Board's findings of fact and recommendation are set forth below.

Section 1245.105(b)(1). The invention relates to a method of pulse modulating data for tape recording. In tape recording, the normal output signal from a modulator is a string of square waves. On low-cost cassette recorders, this output signal is distorted causing error during playback. The invention embodies opposed pulse modulation of the square wave to form trapezoidally shaped signals to match and offset d.c. signal decay versus time that is caused by the intrinsic inability of magnetic tape to record d.c. The invention resulted from work performed for technical and launch support for the solar pointing aerobee rocket control flight test program. Clearly, the invention is not directly related to a governmental program for creating, developing, or improving products, processes, or methods for use by the general public.

Section 1245.105(b)(2) and section 1245.105(b)(3). The invention may find application in word processing and computer devices where digital data is to

be recorded. As such, the invention is not likely to be required by governmental regulations for use by the general public, nor is it deemed to directly concern the public health, public safety, or public welfare.

Section 1245.105(b)(4). The invention is in the field of technology relating to electronic circuitry. This technology has been extensively developed over the past 25 years as evidenced by the improvements made in radio, TV, communication networks, and computer systems. Research and development is continuing in this field by private industry to improve miniaturization techniques and to make durable, highly reliable integrated circuits and components. Numerous companies are involved in the technology of electronic circuitry such as Texas Instruments, RCA, IBM, Motorola, to mention a few. Clearly, the invention is not in a field of technology in which there has been little significant experience outside of work funded by the Government, or where the Government has been the principal developer of the field, and the acquisition of exclusive rights to the invention would not confer on the petitioner a preferred or dominant position.

In view of the petitioners' plans and intentions to bring the invention to the point of practical or commercial application, the incentive provided by waiver will increase the likelihood that the benefits of the invention would be readily available to the public at an early date. Petitioner, who is one of two coinventors, requested waiver of rights inasmuch as the other coinventor and the contractor, Lockheed Missile and Space Company, do not intend to seek commercial rights to the invention. The latter parties submitted statements to the Board giving up any rights that they might have in the invention. Petitioner plans to assemble the invention by adapting a Sony cassette recorder to an RCA microprocessor since there is potentially a large market for low-cost cartridge/cassette recording of com-

puter data as in the word processing and computer hobbyist markets. Petitioner's present effort is directed toward exploiting digital recording of micro-processor data. In addition to the assembly of parts, the invention will require final production design and packaging for specific applications. Petitioner will apply for a patent to the invention at his own expense on grant of waiver. He also intends to license the invention to manufacturers of recording

equipment. Waiver of rights would provide petitioner with the incentive to continue to work the invention so that its benefits might be made available to the public at an early date.

The Board concludes that the interests of the United States would best be served by waiver of rights to this invention, and recommends that the petition for waiver of domestic rights be GRANTED.



## NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

PETITIONER: California Institute of Technology  
INVENTION: Coal Desulfurization Process  
DECISION: Petition DENIED, Domestic Rights

**SUBPART 1245.1, NASA Patent Waiver Regulations (1972)**

**GOVERNMENT PROGRAM SECTION 1245.105(b)(1)—Methods of coal desulfurization are intended for adoption by fuel processors.**

**PUBLIC HEALTH SECTION 1245.105(b)(3)—Burning of desulfurized coal will improve quality of air.**

**WAIVER AS NECESSARY INCENTIVE—Development of the invention is being supported by NASA and the Bureau of Mines. Waiver is not seen to promote invention development with private funds so long as the Government is continuing its R. & D. support.**

**FINDINGS AND RECOMMENDATION OF THE INVENTIONS AND CONTRIBUTIONS BOARD:**

The petitioner, California Institute of Technology, is a contractor of the National Aeronautics and Space Administration under contract NAS 7-100. The petition was made for waiver of domestic rights of the United States in the invention described below. The invention was made in the performance of work required under the above-identified contract and in the manner specified in section 305(a) of the National Aeronautics and Space Act of 1958 as determined by the Administrator. The petition was considered by the Inventions and Contributions Board on April 5, 1978.

The Board found that the invention is of the type for which waiver is proscribed by section 1245.105(b)(1), section 1245.105(b)(3), and section 1245.105(c) of the NASA Patent Waiver Regulations (1972). Specifically, the Board found pursuant to section 1245.105(b)(1) that the invention is directly related to a governmental program for creating, developing, or improving products, processes, or methods for use by the general public. The Board also found under section 1245.105(b)(3) that the invention directly concerns the public welfare. In addition, petitioner did not show to the satisfaction of the Board that waiver is a necessary incentive to call forth risk capital and expense to bring the invention to the point of practical application as required by section 1245.105(c).

Petitioner, having been promptly notified of the Board's adverse findings, requested reconsideration within the time period set by the Board. However, petitioner did not file a statement within the prescribed time as provided by section 1245.112 of the Regulations setting forth its arguments on recon-

sideration. The Board's findings of fact and recommendation are set forth below.

The invention relates to a method of removing organic sulfur from coal by the chlorinolysis of coal at moderate temperature and at atmospheric pressure. Specifically, chlorine gas is bubbled through a slurry of moist coal to produce a chlorinated solvent. The inorganic and organic sulfurs are then converted to sulfate sulfur and removed by leaching in water. The chlorinated coal is then separated, hydrolyzed and dechlorinated by heating at 400° to 500° C. By this process, more than 70 percent total sulfur can be removed from the treated coal. The invention resulted from the performance of work supported by the NASA Office of Energy Programs relating to energy technology applications. An objective of this task is to apply space and aeronautical technology to the solution of problems in the civil sector, and to assure effective use of the aerospace capabilities and experience of NASA in direct support of the national energy research and development needs. Under this applications effort, NASA is currently funding coal desulfurization research in conjunction with support from the Department of Interior, Bureau of Mines. Inasmuch as the results of the laboratory tests are encouraging, there is planned involvement of other Government agencies and private industry to support this effort to large-scale development and demonstration facilities for commercial end use. Accordingly, the Board finds, pursuant to section 1245.105(b)(1) of the NASA Patent Waiver Regulations, that the invention is directly related to a governmental program for creating, developing, or improving products, processes, or methods for use by the general public.

Although the invention is in the formative stage of development should it become technically and commercially viable, the process would enable direct burning of high-sulfur coal in utility and industrial coal-fired power plants for the generation of electricity. Presently, Federal standards limit the amount of sulfur-dioxide which can be emitted from coal-burning power plants. These restrictions are met by the use of low-sulfur coal or the use of costly stack-gas clean-up systems. Desulfurization of coal will therefore be a significant factor in meeting air pollution standards and in providing an effective low-cost process for the utilization of the vast U.S. reserves of high-sulfur coal to meet expanding energy requirements. As such, the Board finds, pursuant to section 1245.105(b)(3) of the NASA Patent Waiver Regulations, that the invention directly concerns the public health or public welfare.

The Board, having considered petitioner's plans and intentions to work the invention, is unable to find

under section 1245.105(c) of the Patent Waiver Regulations that waiver is a necessary incentive to call forth risk capital and expense to bring the invention to the point of practical application. Petitioner's plans and intentions do not establish that the invention will be worked at the earliest practical time. Both NASA and the Bureau of Mines are engaged in furthering development of the subject coal desulfurization process. Also, other Government support (Department of Energy) as well as industry participation are being invited to further develop the concept for end commercial use. The coal energy task is therefore a viable Government project under which the subject invention is likely to be further developed to the point of practical application.

The Board concludes that the interests of the United States would not be served by waiver of rights, and recommends that the petition for waiver of domestic rights be DENIED.

## NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

PETITIONER: Energetics Science, Incorporated  
 INVENTION: Method and Device for the Detection and Measurement of Hydrazine Monomethyl Hydrazine and Unsymmetrical Dimethyl Hydrazine Vapors  
 DECISION: Petition GRANTED, Domestic and Foreign Rights

## SUBPART 1245.1, NASA Patent Waiver Regulations (1972)

**PUBLIC HEALTH SECTION 1245.105(b)(3)—Detector for Hydrazine not found to directly concern public health as commercial use of the gas is very limited.**

**PLANS AND INTENTIONS—**Petitioner, a small business concern, requires proprietary rights in the invention to recover its investment capital for development.

## FINDINGS AND RECOMMENDATIONS OF THE INVENTIONS AND CONTRIBUTIONS BOARD:

The petitioner, Energetics Science, Inc., is a contractor of the National Aeronautics and Space Administration under contract NAS 10-8982. The petition was made for waiver of domestic and foreign rights of the United States in the invention described below. The invention was made in the performance of work required under the above-identified contract and in the manner specified in section 305(a) of the National Aeronautics and Space Act of 1958 as determined by the Administrator. The petition was considered by the Inventions and Contributions Board on December 15, 1977.

The Board, having considered the allegations and claims of the petitioner, makes all the findings required under section 1245.105(b) and section 1245.106 of the NASA Patent Waiver Regulations (1972). The Board's findings and recommendations are set forth below.

Section 1245.105(b)(1). The invention relates to the detection of fuels in the hydrazine family such as anhydrous hydrazine ( $N_2H_4$ ), monomethyl hydrazine (MMH), and unsymmetrical dimethyl hydrazine (UDMH). The vapors of these fuels are corrosive, explosive, and toxic with maximum long-term exposure concentrations established by OSHA of 0.2 parts per million for MMH, .015 for UDMH, and 1 PPM for  $N_2H_4$ . The method and operating principle of the invention is an electrochemical cell. The hydrazine is reacted at a catalytically active electrode in aqueous electrolyte, and the process is carried out at a potential controlled diffusion electrode. The invention was made under a contract at the Kennedy Space Center (KSC) to develop and test an engineering prototype hydrazine sensor which is accurate, reliable, simple to operate and maintain, and cost effective. A hydrazine detector having such characteristics is essential since future

programs at KSC involve the use of large quantities of hypergolic propellants. Accordingly, the invention is not directly related to a governmental program for creating, developing, or improving products, processes, or methods for use by the general public.

Section 1245.105(b)(2) and section 1245.105(b)(3). The invention may find utility as an apparatus for detecting, monitoring, and analyzing hydrazine vapors. Within the United States hydrazine gas is produced primarily at missile propellant manufacturing plants. Commercial use of the gas is therefore very limited. As such, the invention is not considered to have a direct or significant impact on the health, safety, or welfare of the general public. While numerous hydrazine detectors are available, their lack of repeatability renders the units unsuitable for use with automated checkout systems, and their cost and complexity prohibit coverage of all possible leak locations. It is therefore a novel feature of this invention to provide low-level and continuous measurement of hydrazine vapor in air. In view of the above, the Board is unable to find that the invention directly concerns the public health, public safety, or public welfare, or that it would be required by governmental regulations for use by the general public.

Section 1245.105(b)(4). The invention is in the field of electrochemistry as it relates to analytical instrumentation. Petitioner has previously developed devices which detect and monitor various noxious gasses. The subject invention is directed to a specific apparatus and method which utilizes a three-electrode electrochemical system to provide continuous measurement and portability. The technology of gas monitoring is highly developed as evidenced by the several subclasses of patents relating to such devices listed in the U.S. Patent and Trademark Office *Manual of Classification of Pa-*

tents. Also, various trade journals in the electrochemical field list numerous sources of monitoring devices which cover a broad spectrum of gas and fluid detection systems. Accordingly, the invention is not in a field of technology in which there has been little significant experience outside of work funded by the Government, or where the Government has been the principal developer of the field, and the acquisition of exclusive rights in the invention would not confer on the petitioner a preferred or dominant position.

In view of petitioner's plans and intentions to bring the invention to the point of practical application, the incentive provided by waiver will increase the likelihood that the benefits of the invention would be available to the public at an early date. Petitioner is a small business concern which intends to invest the necessary capital to produce and support a line of instrumentation to detect hydrazine vapor. This invention will complement its line of commercial air pollution monitors and analysis systems. Both continuous fixed installation and portable installation are under consideration at this time. Marketing of the invention will be done through petitioner's distribution outlets and sales representatives. Because of petitioner's small business status, it requires

property rights in any patent that might be obtained in order to justify commercial exploitation of the invention. Waiver of rights would therefore provide the incentive for petitioner to continue its efforts to develop and market the invention for both governmental and commercial applications.

Petitioner has requested waiver of foreign rights in Japan, Germany, France, England, Italy, and Sweden. Presently, 25 percent of petitioner's sales are outside of the United States, and it plans expansions of such foreign sales. Petitioner plans to manufacture equipment utilizing the subject invention within the United States for sale abroad. The production of devices in the United States and the sale abroad would impact favorably on the U.S. economy in terms of increasing the number of jobs as well as improving the trade posture of the United States. Accordingly, the Board finds, pursuant to section 1245.106 of the Waiver Regulations, that waiver of foreign rights is consistent with the economic interests of the United States.

The Board concludes that the interests of the United States would best be served by waiver of rights, and recommends that the petition for waiver of domestic and foreign rights be GRANTED.

**Thursday, November 3, 1977**



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**NATIONAL AERONAUTICS  
AND  
SPACE ADMINISTRATION**



**PATENT WAIVER  
REGULATIONS  
14 CFR 1245.1**

**Reprint from Pages 57449-57454  
of the Federal Register  
Volume 42 No. 212**

## Title 14—AERONAUTICS AND SPACE

### CHAPTER V—NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

#### PART 1245—PATENTS

##### Subpart 1—Patent Waiver Regulations

**AGENCY:** National Aeronautics and Space Administration.

**ACTION:** Final regulations.

**SUMMARY:** The National Aeronautics and Space Administration (NASA) finalizes revision to its Patent Waiver Regulations. This revision, along with revisions to the NASA Procurement Regulations (NASA PR 9-107 and 9-109; PRD 76-14) provides greater uniformity, to the extent consistent with the requirements of section 305 of the National Aeronautics and Space Act of 1958 (42 U.S.C. 2457), between certain policies, practices, and procedures followed by NASA and other agencies in the implementation of the revised Presidential Memorandum and Statement of Government Patent Policy, August 23, 1971 (36 FR 16887-16892).

**EFFECTIVE DATE:** November 3, 1977.

**ADDRESS:** General Counsel, National Aeronautics and Space Administration, Washington, D.C. 20546.

**FOR FURTHER INFORMATION CONTACT:**

Robert F. Kempf, 202-755-3932.

**SUPPLEMENTARY INFORMATION:** On May 18, 1977, a notice of proposed revisions to the NASA Patent Waiver Regulations was published in the FEDERAL REGISTER (42 FR 25508-25513). The purpose of the revision is (1) to uniformly adopt, to the extent consistent with statute, the policies, practices, and procedures in implementing the aforesaid Presidential Statement, (2) modify certain internal handling procedures for waiver petitions submitted to NASA, and (3) set forth NASA's policy with respect to waiver under contracts for research, development, or demonstration work awarded by NASA on behalf of the Energy Research and Development Administration (ERDA) (or successor agencies). Interested parties were permitted 30 days to submit written comments regarding the proposed revisions. Consideration has been given to all material received and changes have been made as follows:

Section 1245.104(b)(1) has been modified to make it clear that advanced waivers apply to inventions "reported under the terms of the contract," thereby insuring consistency with the invention rights clause contained in the contract.

Sections 1245.104(g) and 1245.105(a)(2) have been modified to clarify the applicability of waivers to any division or continuation patent applications.

Section 1245.112(b)(4) has been amended to require the Inventions and Contributions Board to promptly notify the petitioner of its proposed recommendation to the Administrator.

The revised Patent Waiver Regulations are hereby adopted and shall become effective on November 3, 1977.

Subpart 1 is revised in its entirety as follows:

##### Subpart 1—Patent Waiver Regulations

###### Sec.

- |          |   |
|----------|---|
| 1245.100 | Scope.  |
| 1245.101 | Applicability.  |
| 1245.102 | Definitions and terms.                                    |
| 1245.103 | Policy.   |
| 1245.104 | Advance waivers.  |
| 1245.105 | Waiver after reporting inventions.                        |
| 1245.106 | Waiver of foreign rights.                                 |
| 1245.107 | Reservations.   |
| 1245.108 | License to contractor.                                    |
| 1245.109 | Revocation and voidability of waivers.                    |
| 1245.110 | Content of petitions.                                     |
| 1245.111 | Submission of petitions.                                  |
| 1245.112 | Notice of proposed Board action and reconsideration.      |
| 1245.113 | Hearing procedure.  |
| 1245.114 | Findings and recommendation of the Board.                 |
| 1245.115 | Action of the Administrator.                              |
| 1245.116 | Filing of patent applications and reimbursement of costs. |
| 1245.117 | Publication and record of decisions.                      |

**AUTHORITY:** 42 U.S.C. 2457.

##### Subpart 1—Patent Waiver Regulations

###### § 1245.100 Scope.

This Subpart 1 prescribes regulations for the waiver of rights of the United States to inventions made under NASA contract.

###### § 1245.101 Applicability.

The provisions of the subpart apply to all inventions made or which may be made under conditions enabling the Administrator to determine that the rights therein reside in the United States pursuant to section 305(a) of the National Aeronautics and Space Act of 1958, as amended (42 U.S.C. 2457(a)).

###### § 1245.102 Definitions and terms.

As used in this subpart:

(a) "Contract" means any actual or proposed contract, agreement, understanding, or other arrangement with the National Aeronautics and Space Administration (NASA) or another Government agency on NASA's behalf, including any assignment, substitution of parties or subcontract executed or entered into thereunder, and including NASA grants awarded under the authority of 42 U.S.C. 1891-1893.

(b) "Contractor" means the party who has undertaken to perform work under a contract or subcontract.

(c) "Invention" includes any art, method, process, machine, manufacture, design, or composition of matter, or any new and useful improvement thereof, or any variety of plant, which is or may be patentable under the Patent Laws of the United States of America or any foreign country.

(d) "Made," when used in relation to any invention, means the conception or first actual reduction to practice of such invention.

(e) "To the point of practical application" means to manufacture in the case of a composition or product, to practice in the case of a process, or to operate in the case of a machine, and under such conditions as to establish that the invention is being worked and that its benefits are reasonably assessable to the public.

(f) "Board" means the NASA Inventions and Contributions Board established by the Administrator of NASA within the Administration under section 305(f) of the National Aeronautics and Space Act of 1958, as amended (42 U.S.C. 2457(f)).

(g) "Chairman" means Chairman of the NASA Inventions and Contributions Board.

(h) "Petitioner" means a contractor or prospective contractor who requests that the Administrator waive rights in an invention or class of inventions made or which may be made under a NASA contract. In the case of an identified invention, the petitioner may be the inventor(s).

(i) "Government agency" includes any executive department, independent commission, board, office, agency, administration, authority, Government corporation, or other Government establishment of the executive branch of the Government of the United States of America.

(j) "States and domestic municipal governments" means the States of the United States, the District of Columbia, Puerto Rico, the Virgin Islands, American Samoa, Guam, the Trust Territory of the Pacific Islands, and any political subdivision and agencies thereof.

(k) "Administrator" means the Administrator of the National Aeronautics and Space Administration or his duly authorized representative.

###### § 1245.103 Policy.

(a) In implementing the provisions of section 305(f) of the National Aeronautics and Space Act of 1958, as amended (42 U.S.C. 2457(f)) and in determining when the interests of the United States would be served by waiver of all or any part of the rights of the United States in inventions made in the performance

of work under NASA contracts, the Administrator will be guided by the objectives set forth in the National Aeronautics and Space Act of 1958, as amended (42 U.S.C. 2451-2477) and by the basic policy of the revised Presidential Memorandum and Statement of Government Patent Policy issued August 23, 1971 (36 FR 16887-16892). Among the most important goals thereof are to provide incentives to foster inventiveness and encourage reporting of inventions made under NASA contracts, to provide for the widest practicable dissemination of new technology resulting from NASA programs, and to promote early utilization, expeditious development, and continued availability of this new technology for commercial purposes and the public benefit. In applying this regulation both the need for incentives to draw forth private initiatives and the need to promote healthy competition in industry must be weighed.

(b) Several different situations when waiver of all or any part of the rights of the United States may be requested are prescribed in §§ 1245.104-1245.106. Under § 1245.104, advance waiver of rights to any or all of the inventions which may be made under a contract may be requested prior to the execution of the contract, or within 30 days after execution of the contract. Waiver of rights to an identified invention made and reported under a contract may be requested under any of these provisions even though a request under a different provision was not made, or if made, was not granted. Waiver of foreign rights under § 1245.106 may be requested concurrently with domestic rights or independently thereof.

(c) With respect to inventions which may be or are made or conceived in the course of or under contracts for research, development or demonstration work awarded by NASA on behalf of the Department of Energy (DOE) or in support of an DOE program, on a reimbursable basis pursuant to agreement between DOE and NASA, the waiver policy, regulations, and procedures of DOE will be applied. (See § 1245.110(e), § 1245.111(b).)

#### § 1245.104 Advance waivers.

(a) The provisions of this § 1245.104 apply to petitions for waiver of domestic rights to any or all of the inventions which may be made under a contract. Such petitions may be submitted by the contractor prior to its execution of the contract or within 30 days thereafter.

(b) (1) The Board shall recommend to the Administrator that waiver of domestic rights to any or all of the inventions which may be made under the NASA contract involved be granted when the Board makes each of the findings of paragraphs (c) and (d) of this section and concludes that the interest of the United States would be served thereby. Such waiver shall apply to inventions reported under the terms of the contract and which are designated at the time of reporting as being an invention on which the waiver recipient intends to file or has filed a U.S. patent application.

(2) When the Board is unable to make one or more of the findings to support a waiver under paragraph (c) of this

section as to the contract but nevertheless finds that exceptional circumstances exist so that the public interest would best be served by a waiver of rights to any or all of the inventions which may be made under the contract, the Board shall recommend to the Administrator that waiver be granted (conditions of paragraph (d) of this section are not relevant to the Board's findings under this subparagraph). A finding of exceptional circumstances shall be accompanied by a discussion of the rationale therefor. Examples of exceptional circumstances would include: A contract where participation of the contractor may only be secured through the grant of waiver and such contractor is deemed essential to a NASA program objective; a contract having as a principal objective the application of aerospace related technology to other uses in accordance with an established NASA technology application program and where the grant of waiver would materially advance this objective; or, a cooperative endeavor where the contract calls for a significant contribution of funds by the contractor to the work to be performed. In the case of an invention which is identified prior to execution of the contract, exceptional circumstances may also be found where waiver is a necessary incentive to call forth risk capital and expense to bring the invention to the point of practical or commercial application and where either (i) the contractor has established substantial equities at its own expense in the development of the invention; or, (ii) the grant of advance waiver will significantly advance the availability of the invention to the general public.

(c) (1) It is not a principal purpose of the contract to create, develop or improve products, processes, or methods which are intended for commercial use (or which are otherwise intended to be made available for use) by the general public at home or abroad, or which will be required for such use by governmental regulations.

(2) It is not a principal purpose of the contract to explore into fields which directly concern the public health, public safety, or public welfare.

(3) The contract is not in a field of science or technology in which there has been little significant experience outside of work funded by the Government, or where the Government has been the principal developer of the field, and the acquisition of exclusive rights at the time of contracting would not likely confer on the petitioner a preferred or dominant position.

(4) The contract is not for services of the petitioner for (i) the operation of a Government owned research or production facility; or (ii) coordinating and directing the work of others.

(d) (1) The purpose of the contract is to build upon existing knowledge or technology, to develop information, products, processes, or methods for use by the Government.

(2) The work called for by the contract is in a field of technology in which the petitioner has acquired technical competence (demonstrated by factors such as know-how, experience, and patent position), and either (i) the work is directly related to an area in which the

petitioner has an established nongovernmental commercial position; or (ii) the commercial position of the petitioner is not sufficiently established, but a special situation exists such that the public interest in the availability of inventions would best be served by a waiver of rights to the petitioner. Such special situations include, but are not limited to the following:

(i) A newly formed company having a definite program for establishing a nongovernmental commercial position in the field of the contract or in an area directly related thereto.

(ii) An established company lacking an established nongovernmental commercial position in the field of the contract or a directly related field, but having established plans and programs for achieving such a position.

(iii) An educational or nonprofit institution having a promulgated policy and an effective program for acquiring rights to inventions and for acting by itself or through others to bring the results of such inventions to commercial application.

(e) When a petition for waiver is submitted pursuant to paragraph (a) of this section, prior to contract execution, it will be processed expeditiously so that a decision on the petition may be reached prior to execution of the contract. However, if there is insufficient time or insufficient information is presented, or for other reasons which do not permit a recommendation to be made without unduly delaying execution of the contract, the Board will inform the contracting officer that no recommendation has been made and the reason therefor. The contracting officer will then notify the petitioner of the Board's action.

(f) After notification by the contracting officer under paragraph (e) of this section, the petitioner may, upon its execution of the contract, or within 30 days thereof, request the Board to reconsider the matter under paragraph (b) of this section either on the record or with any additional statements submitted in support of the original petition.

(g) A waiver granted pursuant to a petition submitted under this § 1245.104 shall apply only to those inventions reported under the terms of the applicable contract and which are designated at the time of reporting as being an invention on which the petitioner intends to file or has filed a U.S. patent application. The waiver shall extend to the claimed invention of any division or continuation of the patent application filed on the reported invention provided the claims of the subsequent application do not substantially change the scope of the reported invention.

(h) A waiver granted pursuant to a petition submitted under this § 1245.104 shall extend to any contract changes, modifications, or supplemental agreements, so long as the purpose of the contract or the scope of work to be performed is not substantially changed.

#### § 1245.105 Waiver after reporting inventions.

(a) (1) The provisions of this § 1245.105 apply to petitions for waiver of domestic rights to identified inventions which have been reported to NASA and

to which a waiver of rights has not been granted pursuant to § 1245.104. A petition for waiver under this section should be filed promptly after the reporting of the invention to NASA, and must be submitted prior to the filing by NASA of a U.S. patent application claiming the reported invention.

(2) A waiver granted pursuant to this section shall extend to the claimed invention of any division or continuation of that patent application filed on the reported invention provided the claims of the subsequent application do not substantially change the scope of the reported invention.

(b) The Board shall recommend to the Administrator that waiver of domestic rights to an identified invention i.e. granted where the Board makes all of the findings below and concludes that the interest of the United States would be served thereby:

(1) The invention is not directly related to a governmental program for creating, developing, or improving products, processes, or methods for use by the general public at home or abroad.

(2) The invention is not likely to be required by governmental regulations for use by the general public at home or abroad.

(3) The invention does not directly concern the public health, public safety, or public welfare.

(4) The invention is not in a field of science or technology in which there has been little significant experience outside of work funded by the Government, or where the Government has been the principal developer of the field, and the acquisition of exclusive rights in the invention would not likely confer on the petitioner a preferred or dominant position.

*Provided*, that the Board also finds in view of the petitioner's plans and intentions to bring the invention to the point of practical application, and the activities of the Government, the incentives provided by waiver will increase the likelihood that the benefits of the invention would be readily available to the public at an early date.

(c) If the Board is unable to make one of the findings to support a waiver under paragraph (b) (1) through (4) of this section, the Board may nevertheless recommend that waiver of domestic rights be granted by the Administrator if the Board further finds that such waiver is a necessary incentive to call forth risk capital and expense to bring the invention to the point of practical application, or that the Government's contribution to the invention is small compared to that of the contractor.

#### § 1245.106 Waiver of foreign rights.

(a) The Board will consider the waiver of domestic and foreign rights concurrently when so requested by the petitioner in accordance with § 1245.110(d). Where the Board makes the findings necessary to support a waiver of domestic rights, the petitioner will normally be granted the right to secure patents in any country in which it elects to file provided that the grant of such right is consistent with the economic interests of the United States. The Board may also

recommend the grant of only foreign rights, in accordance with the guidelines of paragraph (b) of this section, when the interests of the United States will best be served thereby.

(b) The Board will also consider a separate request for the waiver of the right to secure a patent in any country in which the petitioner elects to file as to an identified invention when so requested by the petitioner in accordance with § 1245.110(d). Waiver of such foreign rights will normally be granted in countries in which the Administrator does not desire to file an application for patent provided that the grant of such rights is consistent with the economic interests of the United States.

(c) When the Administrator determines that it is in the best interest of the Government and the petitioner to withhold the release or publication of information on an invention for which the petitioner has requested waiver and is to file foreign patent applications thereon, NASA may agree, upon written request by the petitioner, to use its best efforts to withhold publication until a patent application is filed thereon, but in no event shall the Government or its employees be liable for any publication thereof.

#### § 1245.107 Reservations.

(a) With respect to any particular invention, each waiver of domestic or foreign rights granted shall be subject to the reservation of an irrevocable, non-exclusive, non-transferable, royalty-free license for the practice of the invention throughout the world by or on behalf of the U.S. Government or any agency thereof, any foreign government pursuant to any existing or future treaty or agreement with the United States, or States and/or domestic municipal governments unless the Administrator determines, based upon a recommendation of the Board, that it would not be in the public interest to acquire the license for States and/or domestic municipal governments.

(b) With respect to any particular invention, each waiver of domestic rights granted shall be subject to the reservation by the Administrator of the right to require the granting of a nonexclusive or exclusive license for the practice of the invention to any responsible applicant on terms that are reasonable under the circumstances:

(1) Unless the waiver recipient, its licensee, or assigns have taken effective steps within 3 years after a U.S. patent issues on the invention to bring the invention to the point of practical application and thereafter continue to work the invention and make its benefits reasonably accessible to the public; or

(2) Unless within 3 years after a U.S. patent issues on the invention, the waiver recipient, its licensee, or its assigns have made the invention available for licensing royalty-free or on terms that are reasonable in the circumstances; or

(3) To the extent that the invention is required for public use by governmental regulations or as may be necessary to fulfill health, safety, or welfare needs, or for other public purposes stipulated in the contract.

(c) With respect to any particular

invention, each waiver granted for domestic or foreign rights shall be subject to the reservation by the Administrator of the right to require refund of any amounts received as royalty charges on the waived invention in procurements for or on behalf of the Government and to provide for that refund in any instrument transferring rights to any party in the waived invention.

(d) With respect to any particular invention, each waiver granted for domestic or foreign rights shall be subject to any other reservations called for by the Administrator on the grant of the petition.

(e) The waiver recipient shall be given an opportunity to show cause before the Board why it should not be required to grant a license under paragraph (b) of this section or why it should retain the principal or exclusive rights as provided by waiver for a further period of time.

#### § 1245.108 License to contractor.

Each contractor reporting an invention is granted a license for each filed patent application and any resulting patent in which the Government acquires title of the scope and on the terms and conditions specified in the NASA Licensing Regulations (14 CFR 1245.204(a)).

#### § 1245.109 Revocation and voidability of waivers.

(a) If the waiver recipient fails to file a domestic or foreign patent application on any waived invention within the prescribed time periods, or decides not to continue prosecution of any such patent application, or to pay any of the required maintenance fees, or for any reason decides not to retain title to any such patent application or any patent issued thereon, the waiver recipient shall notify the Chairman and shall, upon request, convey to NASA the entire right, title, and interest in the invention, and to any corresponding patent application or patent. The conveyance shall be made by delivering to the Chairman duly executed instruments (prepared by the Government) and, if applicable, such other papers as are deemed necessary to vest in the Government the entire right, title, and interest in the invention and any corresponding patent application. In addition, any waiver of rights (domestic or foreign) shall be voidable as set forth in paragraphs (b)-(d) of this section.

(b) With respect to any particular invention, each waiver of domestic rights shall be voidable at the option of the Administrator unless:

(1) Within 6 months from the date of reporting an invention under a contract subject to a waiver granted pursuant to § 1245.104, or 6 months from the date of the granting by the Administrator of a waiver pursuant to § 1245.105, or such longer periods as may be approved by NASA for good cause shown, the waiver recipient causes an application for U.S. Letters Patent to be filed disclosing and claiming the invention and shall include as the first paragraph of the specification following the abstract, the statement:



The invention described herein was made in the performance of work under NASA Contract No. ----- and is subject to the provisions of section 305 of the National Aeronautics and Space Act of 1958 (72 Stat. 435; 42 U.S.C. 2457).

(2) Within 2 months after such filing or within 2 months after the date of the grant of waiver if such patent application previously has been filed, the waiver recipient delivers to the Chairman a copy of such application including the filing date and serial number.

(3) Within 6 months after such filing, or within 6 months after the grant of waiver if a patent application has been previously filed, the waiver recipient delivers to the Chairman a duly executed and approved instrument prepared by the Government, fully confirmatory of all the rights to which the Government is entitled, and provide the Administrator an irrevocable power to inspect and make copies of the patent application.

(4) The waiver recipient furnishes to the Chairman a copy of the patent within 2 months after the patent is issued on such application.

(5) The waiver recipient notifies the Chairman not less than 30 days before the expiration of the initial response period for any action required by the Patent and Trademark Office of any decision not to continue prosecution of the application and delivers to the Chairman executed instruments granting the Government a power of attorney to prosecute the application.

(6) The waiver recipient grants any license which the Administrator may require pursuant to § 1245.107.

(7) The waiver recipient files a utilization report with the Board, upon NASA's written request, not more often than annually. Such report shall set forth in detail the steps taken by the waiver recipient or its transferee regarding the progress, development, application, and commercial use being made and that is intended to be made of the waived invention.

(8) The waiver recipient notifies the Chairman in not less than 60 days prior to any transfer of principal rights in such invention to any party, and submits a statement of the transferee's development and commercialization plans to bring the invention to the point of practical application. Such statement should accompany the notification or it may be submitted in not less than 30 days prior to the transfer of rights. The statement must show to the Board's satisfaction that the property rights in the transferee will increase the likelihood that the benefits of the invention would be made readily available to the public at an early date.

(9) The waiver recipient complies with any other terms and conditions called for by the Administrator with respect to the grant of the petition.

(c) With respect to any particular invention, each waiver granted shall be voidable at the option of the Administrator if a patent claiming such invention is held, in a final determination, to have been used in violation of the antitrust laws in any suit, action, or proceeding brought before a properly constituted

authority authorized to hear such matter.

(d) With respect to any particular invention, waiver of foreign rights as to any foreign country shall be voidable at the option of the Administrator unless:

(1) A patent application is filed in the country within 8 months from the date a corresponding U.S. application is filed, or 6 months from the date a license is granted by the Commissioner of Patents and Trademarks to file foreign applications where such filing has been prohibited for security reasons, or such longer periods as may be expressly approved by the Administrator;

(2) The waiver recipient furnishes to the Chairman the identifying serial number and filing date of each foreign patent application filed promptly upon receipt thereof; and, upon request, a copy of an English version of the foreign application without additional compensation and a copy of the foreign patents;

(3) The waiver recipient executes and furnishes to the Chairman instruments fully confirmatory of the rights herein reserved by the Government; and

(4) The waiver recipient, in the event it elects not to continue prosecution of any foreign application filed on such invention or if it intends to abandon a foreign patent by the nonpayment of a maintenance tax, notifies the Chairman within sufficient time to allow assumption of prosecution by the Government, or payment of the maintenance tax, respectively, and delivers to the Chairman such duly executed instruments as are necessary to vest in the Administrator title thereto, including an instrument of assignment.

#### § 1245.110 Content of petitions.

(a) General contents and forms. Forms which may be used in petitioning for waiver and for filing utilization reports are available from the NASA Inventions and Contributions Board, National Aeronautics and Space Administration, Washington, D.C. 20546. Each request for waiver of domestic or foreign rights under § 1245.104, § 1245.105, or § 1245.106 shall be by petition to the Administrator and shall include:

(1) An identification of the petitioner, its place of business and address, and if the petitioner is represented by counsel, the name, address, and telephone number of the counsel;

(2) An identification by number of the pertinent NASA contract or proposed contract;

(3) The nature and extent of the rights desired and a citation to the section under which the petition is submitted; and

(4) The signature of the petitioner or its authorized representative, and date of signature.

(b) Petitions for advance waiver under § 1245.104. In addition to the information specified in paragraph (a) of this section, each petition for waiver under § 1245.104 shall include:

(1) A copy of the statement of work of the pertinent NASA contract or proposed contract;

(2) A full and detailed statement of facts sufficient to enable the Board to make the findings regarding the contract

and the petitioner as specified in § 1245.104 and, if applicable, whether exceptional circumstances of § 1245.104(b) and/or special situations under § 1245.104(d) (2) are present; and

(3) The date of contractor's execution of the contract, if the petition is filed subsequent to contract execution.

(c) Petitions for waiver for identified inventions under § 1245.105. A separate petition shall be submitted for each identified invention except as provided by § 1245.105(a)(2). In addition to the information specified in paragraph (a)

of this section, such petition shall include:

(1) The full names of all inventors;  
(2) A statement whether a patent application has been filed on the invention, together with a copy of such application if filed; or, if not filed, a complete description of the invention;

(3) If a patent application has not been filed, any information which may indicate a potential statutory bar to the filing of a patent application under 35 U.S.C. 102 or a statement that no bar is known to petitioner to exist;

(4) A full and detailed statement of facts sufficient to enable the Board to make the findings regarding the invention as specified in § 1245.105 (b) or (c);

(5) Where principal rights in the waived invention are to be transferred to another party, a statement identifying such party and its relationship to the petitioner; and

(6) Where the petitioner(s) is the inventor(s), a statement in writing from the contractor that the contractor will not request waiver of rights and authorization of the contractor.

(d) Petitions for waiver of foreign rights under § 1245.106. A petition for waiver of foreign rights may accompany and be a part of a petition for waiver of domestic rights under either § 1245.104 or § 1245.105, or a petition for foreign rights may be submitted independently of any request for domestic rights under § 1245.106(b). In addition to the information specified in paragraph (a) of this section, petition for waiver of foreign rights shall include, where feasible, a denomination of the foreign countries in which petitioner elects to secure or intends to file patent applications, and its plans and intentions to practice and/or license the invention in such countries.

(e) Petitions for waiver under § 1245.103(c). Contents of the petition shall normally be as prescribed by the other Government agency, and petitioner may use any forms provided by such agency.

#### § 1245.111 Submission of petitions.

(a) Petitions for advance waiver of domestic rights under § 1245.104 or advance waiver of foreign rights under § 1245.106 presented prior to contract execution must be submitted to the contracting officer. Any such petitions submitted by organizations selected for negotiation of a contract will be processed and forwarded to the Board for consideration as specified in the NASA Procurement Regulations (41 CFR 18-9.109-6(e)). All other petitions shall be submitted directly to the Inventions and Contributions Board, National Aero-

navitics and Space Administration, Washington, D.C. 20546.

(b) Any waiver petitions submitted under § 1245.103(c) should be forwarded to the NASA field installation patent counsel for transmittal to DOE for processing.

**§ 1245.112 Notice of proposed Board action and reconsideration.**

(a) Notice. Except as provided by § 1245.104(e) the Board will notify the petitioner, through the contracting officer for petitions for advance waiver prior to contract execution, and directly for all others:

(1) Whether it proposes to recommend to the Administration that the petition be:

- (i) Granted in the extent requested;
- (ii) Granted in an extent different from that requested; or
- (iii) Denied.

(2) Of the reasons for any recommended action adverse to or different from the waiver of rights requested by the petitioner.

(b) Request for reconsideration and statements required.

(1) If, pursuant to paragraph (a) of this section, the Board notifies the petitioner that the Board proposes to recommend action adverse to or different from the waiver requested, the petitioner may, within such period as the Board may set, but not less than 15 days from such notification, request reconsideration by the Board.

(2) If reconsideration has been requested within the prescribed time, the petitioner shall, within 30 days from the date of the request for reconsideration, or within such other time as the Board may set, file a statement setting forth the points, authorities, arguments, and any additional material on which it relies.

(3) Upon filing of the reconsideration statement by the petitioner, the petition will be assigned for reconsideration by the Board upon the contents of the petition, the record, and the reconsideration statement submitted by the petitioner.

(4) The Board, after its reconsideration, will promptly notify the petitioner of its proposed recommendation to the Administrator. If the Board's proposed action is adverse to, or different from, the waiver requested, the petitioner may request an oral hearing within such time as the Board has set.

**§ 1245.113 Hearing procedure.**

(a) If the petitioner requests an oral hearing within the time set, pursuant to § 1245.112(b)(4), the Board shall set the time and place for such hearing and shall so notify the petitioner.

(b) Oral hearings held by the Board shall be open to the public and shall be held in accordance with the following procedures:

(1) Oral hearings shall be conducted in an informal manner, with the objective of providing the petitioner with a full opportunity to present facts and ar-

guments in support of the petition. Evidence may be presented through means of such witnesses, exhibits, visual aids as are arranged for by the petitioner. Petitioner may be represented by any person including its attorney. While proceedings will be ex parte, members of the Board and its counsel may address questions to witnesses called by the petitioner, and the Board may, at its option, enlist the aid of technical advisors or expert witnesses. Any person present at the hearing may make a statement for the record.

(2) A transcript or equivalent record of the proceeding shall be arranged for

by the Board. The petitioner shall submit for the record a copy of any exhibit or visual aid utilized during the hearing.

**§ 1245.114 Findings and recommendations of the Board.**

(a) Findings of the Board. The Board shall consider the petition, the NASA contract, if relevant, the goals cited in § 1245.103(a), the effect of the waiver on the objectives of the related NASA programs, and any other available facts and information presented to the Board by an interested party. The Board shall then determine and make, if applicable, each of the specific findings of fact required by § 1245.104, § 1245.105, or § 1245.106 under which the petition was submitted. The Board shall document its findings.

(b) Recommendation of the Board.

(1) Except as provided in § 1245.104(e), after making the findings of fact, the Board shall formulate its proposed recommendation to the Administrator as to the grant of waiver as requested, the grant of waiver upon terms other than as requested, or denial of waiver.

(2) If the Board proposes to recommend, initially or upon reconsideration or after oral hearing, that the petition be granted in the extent requested or, in other cases, where the petitioner does not request reconsideration or a hearing during the period set for such action, or informs the Board that such action will not be requested, or fails to file the required statements within the prescribed time, the Board shall transmit the petition, a summary record of hearing proceedings, if applicable, its findings of fact with respect thereto, and its recommendation to the Administrator.

**§ 1245.115 Action by the Administrator.**

(a) After receiving the transmittal from the Board, the Administrator shall determine, in accordance with § 1245.103, whether or not to grant any waiver of rights to the petitioner. A waiver pursuant to § 1245.104(b)(2) will be granted only when the Board so recommends.

(b) In the event of denial of the petition by the Administrator, a written notice of such denial will be promptly transmitted by the Board to the petitioner. The written notice will be accompanied with a statement of the grounds for denial.

(c) If the waiver is granted by the Administrator, the petitioner shall be sent an original and one copy of an in-

strument of waiver confirmatory of the conditions and reservations of the waiver grant for his execution. The petitioner shall return the executed copy to the Chairman within 30 days from the grant of waiver. Failure to return such copy within the prescribed time may result in revocation of the waiver of rights granted. Before such action is taken, notice shall be given to petitioner so that it may show cause before the Board why the waiver should not be revoked.

**§ 1245.116 Filing of patent applications and reimbursement of costs.**

(a) In order to protect the interests of the Government and the petitioner in inventions, a petitioner may file a United States patent application for such inventions prior to the Administrator's determination on a petition for waiver. If an application on an identified invention is filed during the pendency of the petition, or within 60 days prior to the receipt of a petition, NASA will reimburse the petitioner for any reasonable costs of such filing and patent prosecution that may have occurred. *Provided:*

(1) Similar patent filing and prosecution costs are not normally reimbursed to the petitioner as direct or indirect costs chargeable to Government contracts;

(2) The petition is ultimately denied with respect to domestic rights, or with respect to foreign and domestic rights, if both are requested; and

(3) Prior to reimbursement, petitioner assigns the application to the United States of America as represented by the Administrator of the National Aeronautics and Space Administration.

**§ 1245.117 Publication and record of decisions.**

The findings of fact and recommendations made to the Administrator by the Board with respect to each petition for waiver shall be recorded by the Board and available to the public. In addition, selected findings and recommendations of the Board shall be published annually.

*Effective Date:* The provisions of this sub-art shall be effective on November 3, 1977, and supersede the NASA Patent Waiver Regulations of August 30, 1972 (37 FR 17547-17551) as of that date, except that (a) any petition pending on the effective date, will be considered under the later regulations unless consideration under the revised regulations is specifically requested by the petitioner, and (b) any petition received on or before December 5, 1977, may be considered under the latter regulations if specifically requested by the petitioner at the time of submission. All petitions received on or after December 5, 1977, will be considered under the new revised Patent Waiver Regulations.

ROBERT A. FROSCHE,  
Administrator.

[FR Doc. 77-31792 Filed 11-2-77; 8:45 am]

## NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

PETITIONER: Westinghouse Electric Corporation  
 INVENTION: CMOS Analog Multiplier for CCD Signal Processing  
 DECISION: Petition GRANTED, Domestic Rights

## SUBPART 1245.1, NASA Patent Waiver Regulations (1977)

**PLANS AND INTENTIONS**—Contractor will license the practice of the invention including a technical assistance "know-how" agreement.

**FINDINGS AND RECOMMENDATION OF THE INVENTIONS AND CONTRIBUTIONS BOARD:**

The petitioner, Westinghouse Electric Corporation, is a contractor of the National Aeronautics and Space Administration under contract NAS 1-13674. The petition was made for waiver of domestic rights of the United States in the invention described below. The invention was made in the performance of work required under the above-identified contract and in the manner specified in section 305(a) of the National Aeronautics and Space Act of 1958 as determined by the Administrator. The petition was considered by the Inventions and Contributions Board on July 27, 1978.

The Board, having considered the allegations and claims of the petitioner, makes the findings required under section 1245.105(b) of the NASA Patent Waiver Regulations (1977). The Board's findings of fact and recommendation are set forth below.

Section 1245.105(b)(1). The invention relates to analog multipliers and, more particularly, to balanced triode analog multipliers for multiplying signals derived from Charge Coupled Device (CCD) taps. A complementary metal oxide semiconductor (CMOS) analog multiplier and buffering scheme is made to achieve a wider dynamic linear operating range than currently available techniques. Specifically, CMOS transistors are used as buffers between stages of the CCD's and a CMOS conductance multiplier in order to shift the level of the d.c. potential present at the CCD stages to appropriate levels for operating the multiplier in a triode region. The multiplier of the invention provides such operation using CCD stages so that the output potentials are substantially the same. The invention was made in the course of work to develop suitable electronics for onboard feature classification/information extraction from multispectral data sources. Accordingly, the invention is not directly related to a governmental program for creating, developing, or improving products, processes, or methods for use by the general public.

Section 1245.105(b)(2) and section 1245.105(b)(3). The invention relates to a device for multiplying analog signals such as stored and received signals so that a comparison thereof is nearly zero. Signal correlation is used to process a return signal by comparing it with a stored signal so that the output can be interpreted. The most probable applications for the invention will be in analog signal processing electronic equipment. Such equipment does not have a direct or significant impact on the health, safety, or welfare of the general public. The invention, therefore, is not likely to be required by governmental regulations for use of the general public, nor is it deemed to directly concern the public health, public safety, or public welfare.

Section 1245.105(b)(4). The invention is in the field of technology of electronic circuitry as it relates to data processing. This technology is highly developed as evidenced by the numerous patents that have been issued relating to charge coupled devices and metal oxide semiconductor silicon integrated circuits. In addition, to petitioner companies such as RCA, Texas Instruments, IBM, Motorola, and others have acquired proprietary positions in this field. Because of the need for miniaturization in high capacity computer systems, these technologies have been extensively investigated for more than 20 years. The Government's role in this field has been directed primarily to aerospace applications where particular requirements of reliability, compactness, and efficiencies must be met. Accordingly, the invention is not in a field of technology in which there has been little significant experience outside of work funded by the Government, or where the Government has been the principal developer of the field, and the acquisition of exclusive rights in the invention would not confer on the petitioner a preferred or dominant position.

In view of petitioner's plans and intentions to bring the invention to the point of practical application, the incentive provided by waiver will increase the likelihood that the benefits of the invention would

be available to the public at an early date. Petitioner points out that the invention is not fully developed in that further work is required to reduce cost, improve performance, and increase reliability. Petitioner intends to license the invention including know-how to enable the licensee to practice the invention. In this regard, its domestic licensing operation involves cooperation and interchange among engineers, marketing experts, and selected patent attorneys assigned to a particular division. Petitioner is presently negotiating a license with a company which is highly capable of placing the invention in commercial use. The most probable application of the

invention will be in analog signal processing electronic equipment. NASA has evaluated the invention and determined that the Government will not fund its further development. Waiver of rights would therefore provide the incentive for petitioner to continue its efforts to license the invention so that its benefits would be made available to the public at an early time.

The Board concludes that the interests of the United States would best be served by waiver of rights, and recommends that the petition for waiver of domestic rights be GRANTED.

## NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

PETITIONER: California Institute of Technology  
 INVENTION: Apparatus for Generating Seismic Signals  
 DECISION: Petition GRANTED, Domestic Rights

## SUBPART 1245.1, NASA Patent Waiver Regulations (1977)

**PUBLIC WELFARE SECTION 1245.105(b)(3)—Detection of beds of oil impacts on national energy program.**

**WAIVER AS NECESSARY INCENTIVE—Aggressive licensing efforts results in commitment by licensee to invest substantial sums of money for further development of the invention.**

## FINDINGS AND RECOMMENDATION OF THE INVENTIONS AND CONTRIBUTIONS BOARD:

The petitioner, California Institute of Technology, is a contractor of the National Aeronautics and Space Administration under contract NAS 7-100. The petition was made for waiver of domestic rights of the United States in the invention described below. The invention was made in the performance of work required under the above-identified contract and in the manner specified in section 305(a) of the National Aeronautics and Space Act of 1958 as determined by the Administrator. The petition was considered by the Inventions and Contributions Board on March 7, 1978.

The Board, having considered the allegations and claims of the petitioner, is unable to make all of the findings required under section 1245.105(b) of the NASA Patent Waiver Regulations (1977). In particular, pursuant to section 1245.105(b)(3) of the Regulations, the invention is found to directly concern the public welfare. The Board, however, recommends grant of waiver of domestic rights as provided by section 1245.105(c) of the Regulations on its further finding that waiver is a necessary incentive to call forth risk capital and expense to bring the invention to the point of practical application. The Board's findings of fact and recommendation are set forth below.

The invention relates to a low-cost apparatus for producing seismic signals as an aid in the exploration of hydrocarbons (oil) and other underground resources. The apparatus comprises a stack of many small explosive charges in an assembly that can be installed in a borehole. The stacked charges are separated by time-delay pyrotechnic elements which detonate the next lower charge at a predetermined interval. A column of many charges separated by time-delay elements enables the production of seismic signals of a wide range of frequencies and amplitudes. These spaced pulses in the surrounding

earth environment are effective in locating beds of hydrocarbon-containing strata less than 100 feet thick, and for identifying those that are found which comprise either sand or shale. The charges are separated by barriers of plastic foam which isolate the force of the explosion of one charge from the next charge. In practice, a small borehole which is several inches in diameter contains numerous charges in a stack so as to produce a long string of explosions. The shock waves are detected by detector apparatus located on the surface of the earth.

The invention was developed under a study funded by the NASA Office of Energy Programs to apply aerospace technology to improve petroleum exploration methods. A study objective was to identify the technology problems of the petroleum exploration industry. To this end, the invention may greatly aid in the exploration for hydrocarbon resources, especially those beds of petroleum less than 100 feet thick. As such, the Board finds under section 1245.105(b)(3) of the Waiver Regulations that the invention directly concerns the public welfare.

The Board, having considered the relationship of the invention to the welfare of the general public, nevertheless finds pursuant to section 1245.105(c) of the Regulations that waiver is a necessary incentive to call forth risk capital and expense to bring the invention to the point of practical or commercial application. Petitioner is not a manufacturing concern and therefore it intends to transfer this technology to the public sector by licensing others to practice the invention. As a result of petitioner's utilization efforts to date, licensing negotiations are underway with a major U.S. oil company which plans to invest several hundred thousand dollars for further research of the invention to demonstrate its feasibility. Without waiver of rights such work may be long delayed if undertaken at all. In view of the

above and, moreover, to encourage others to adopt this technique of petroleum prospecting, waiver would provide petitioner with the incentive to search out additional private funding and support for broader applications of the invention. The Board

concludes that the interests of the United States would best be served by waiver of rights, and recommends that the petition for waiver of domestic rights be GRANTED.

## NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

PETITIONER: Lien C. Yang  
 INVENTION: Air Purification System Using Cryogenic Technique  
 DECISION: Petition GRANTED, Domestic Rights

## SUBPART 1245.1, NASA Patent Waiver Regulations (1977)

**CONTRACTOR-EMPLOYEE INVENTOR PETITIONS FOR WAIVER**—Where contractor notified the Board that it will not request waiver of rights, its employee-inventor may petition for waiver.

**PLANS AND INTENTIONS**—Petitioner is searching for licensees for further R. & D., production, and marketing. Petitioner will provide his expertise assisting in further development.

**FINDINGS AND RECOMMENDATION OF THE INVENTIONS AND CONTRIBUTIONS BOARD:**

The petitioner, Lien C. Yang, has requested waiver of domestic rights to an invention that relates to an air purification system. The invention, described below, was made by petitioner while employed by the California Institute of Technology, a contractor of the National Aeronautics and Space Administration under contract NAS 7-100. The invention was made in the performance of work required under the above-identified contract and in the manner specified in section 305(a) of the National Aeronautics and Space Act of 1958 as determined by the Administrator. The petition was considered by the Inventions and Contributions Board on May 25, 1978.

The Board, having considered the allegations and claims of the petition, makes the findings required under section 1245.105(b) of the NASA Patent Waiver Regulations (1977). The Board's findings and recommendation are set forth below.

Section 1245.105(b)(1). The invention relates to an onsite air purification system that produces cryogenic temperatures by using multistage heat exchanges and expanders. Pollutants from the air are removed by condensation so that ultraclean air is obtained. The system requires the use of highly efficient miniature cryogenic apparatus such as that developed for aerospace applications; for example, infrared detector refrigeration systems. Such systems are operated at liquid oxygen temperatures ( $-183^{\circ}\text{C}$ ) where all the pollutants are trapped by the physical absorption process. In accordance with the teaching of the invention, a series of filters at different cryogenic temperatures trap the pollutants of inlet air resulting in ultraclean air for circulation in a closed environment. There is no known governmental program to develop ultraclean purification systems for use by the general public. The in-

vention therefore is not directly related to a governmental program for creating, developing, or improving products, processes, or methods for use by the general public.

Section 1245.105(b)(2) and section 1245.105(b)(3). The invention, when fully developed, may be expected to find use as an air purifying system. The primary application of the system will be in closed environments where ultraclean air is required. Normally, air circulated through air-conditioning systems is purified by chemical filters, activated carbon filters, or by electronic filters. Such purification has been deemed adequate for most people under normal conditions. While ultraclean air may be essential in certain situations such as hospital operating rooms or other clean room environments, these special requirements are believed to affect only a very small portion of the general public. The Board, therefore, is unable to find that the invention will be required by governmental regulations for use by the general public, nor is it deemed to directly concern the public health, public safety, or public welfare.

Section 1245.105(b)(4). The invention is in the field of technology of cryogenics. Initially, this technology may have been developed under Government support; however, over the past 20 years the preponderance of research and development in this field has been done by private industry at private expense. This is evidenced by the wide application of cryogenics in medicine, industry, materials, and chemical processing. Moreover, numerous nongovernment patents have been granted in the field of cryogenics. It is found, therefore, that the invention is not in a field of technology in which there has been little significant experience outside of work funded by the Government, or where the Government has been the principal developer of the field;

and the acquisition of exclusive rights in the invention would not confer on the petitioner a preferred or dominant position.

In view of the petitioner's plans and intentions to bring the invention to the point of practical or commercial application, the incentive provided by waiver will increase the likelihood that the benefits of the invention would be readily available to the public at an early date. Petitioner, who is the inventor, requested waiver of rights in view of the contractor's lack of interest in the invention. The contractor, having notified the Board that it will not seek waiver of rights, has conveyed sufficient rights so that the petitioner may carry out the obligations of the waiver. Petitioner plans to achieve commercial application of the invention by seeking out a company or companies which will develop and manufacture systems incorporating the invention. Petitioner has contacted several companies each of which has shown interest in the invention for use as an automobile

air-conditioning system. Other uses of the invention may be in the home, office, operating room, or wherever ultraclean air is required. The invention, however, requires significant further development for the above applications; this is estimated to run in the millions of dollars. Moreover, the system's cost must be reduced so as to be competitive with air-conditioning systems now in use. Petitioner estimates further that at least 3 years of work will be required to make the invention commercially suitable for use as air-conditioning/purifying equipment. Waiver of rights would therefore provide the incentive for petitioner to continue his efforts to work the invention so that its benefits might be made available to the public at an early date.

The Board concludes that the interests of the United States would best be served by waiver of domestic rights to this invention, and recommends that the petition for waiver be GRANTED.



## NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

PETITIONER: General Electric Company  
 CONTRACT: Short Core Exhaust Performance Concept  
 DECISION: Petition GRANTED, Domestic and Foreign Rights

## SUBPART 1245.1, NASA Patent Waiver Regulations (1977)

**GOVERNMENTAL PROGRAM SECTION 1245.104(c)(1)**—Energy efficient engine for commercial aircraft is intended to benefit the general public.

**EXCEPTIONAL CIRCUMSTANCES SECTION 1245.104(b)(2)**—Contractor is deemed essential to the program of engine improvement; contractor is cost-sharing the work to be performed; contract provides for cost reimbursement to the Government on commercial sales of engines utilizing the technology of the contract.

**ADVANCE WAIVER UNDER CONTRACT AMENDMENT**—Waiver is applicable only to inventions made under contract amendment; work scope of amendment differs substantially from parent contract; waiver considered as if amendment were a separate and distinct contract.

**FEDD POLICY MADE APPLICABLE TO THE CONTRACT**—NASA's policy For Early Domestic Dissemination (FEDD) of technical information and control of the transfer of technology abroad made part of contract amendment; waiver is to be construed consistent with the FEDD policy and contractor is allowed extended period for filing foreign patent applications.

## FINDINGS AND RECOMMENDATIONS OF THE INVENTIONS AND CONTRIBUTIONS BOARD:

The petitioner, General Electric Corporation, is a contractor of the National Aeronautics and Space Administration under contract NAS 3-20629. The petition was made for waiver of domestic and foreign rights to all inventions that may be made in the performance of work under subtask 2.2(RFP 3-831628Q) of amendment No. 6 to the above contract. The petition was submitted to NASA prior to execution of amendment No. 6 to the above contract, and was considered by the Inventions and Contributions Board on September 19, 1978.

Study contract No. NAS 3-20629 was executed on February 10, 1977, and at that time no advance waiver of rights was requested. In August 1977, amendment No. 2 to the contract was executed. The scope of work of amendment No. 2 was substantially different from the scope of work of the study contract so that for the purposes of waiver amendment No. 2 was considered by the Board as if it were a separate and distinct contract; the contract amendment No. 2 was thus found supportive of an independent petition for waiver. (An advance waiver was subsequently requested and granted under amendment No. 2.) Likewise, the subtask 2.2, amendment No. 6 of study contract NAS 3-20629 is found to support an independent petition for waiver since the work to be performed thereunder is substantially

different from the scope of work of the study contract or any other amendments thereto.

The Board, having considered the allegations and claims of the petitioner, is unable to make all of the findings to support the grant of waiver as required by section 1245.104(c) of the NASA Patent Waiver Regulations (1977). In particular, the Board finds under section 1245.104(c)(1) of the Patent Waiver Regulations that a principal purpose of the contract is to create, develop, or improve products, processes, or methods which are intended for use by the general public or which will be required for such use by governmental regulations. However, the Board further finds under the provision of section 1245.104(b)(2) of the Patent Waiver Regulations that exceptional circumstances exist such that the public interest would best be served by waiver of rights. The Board also finds pursuant to section 1245.106 of the Regulations that waiver of foreign rights is consistent with the economic interests of the United States. The findings of fact and recommendations of the Board are set forth below.

The work to be performed under subtask 2.2, amendment No. 6 of study contract NAS 3-20629 involves the analysis and evaluation of a short-core exhaust

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concept for the G.E. CF-6 engine family so as to reduce the engine's fuel consumption. The CF-6 design and test project, of which this subtask is only a small part, is the outgrowth of work performed under the study contract where the technical and economic feasibility of component improvement concepts for the CF-6 engine family were evaluated for achieving an overall 5 percent fuel savings. The study contract work involved a feasibility analysis of all the identified performance improvement and retention concepts deemed to have a high probability of incorporation into the new production of CF-6 turbo fan engines in the 1980-82 time period. The CF-6 engine is currently in operation and will continue to be in use for the next 15-20 years. The short-core exhaust concept was identified under the study contract as a candidate component engine improvement which could help in achieving significant fuel savings. This work is directly related to the NASA Aircraft Energy Efficiency (ACEE) program whose objectives are to develop component technology to improve engine performance or performance retention characteristics. The use of such technology could reduce the fuel consumption of current engines and be ready for introduction in commercial service in the 1980-82 time period. Therefore, the Board finds pursuant to section 1245.104(c)(1) of the Patent Waiver Regulations, that a principal purpose of the contract amendment is to create, develop, or improve products, processes, or methods which are intended for commercial use (or which are otherwise intended to be made available for such use) by the general public or which will be required for such use by governmental regulations.

The Board, having considered the work to be performed under contract amendment No. 6 and its relationship to the governmental program to reduce aircraft engine fuel consumption, further finds under the provision of section 1245.104(b)(2) of the Patent Waiver Regulations that exceptional circumstances exist so that the public interest would best be served by waiver of rights. More particularly, the contract effort is a cooperative endeavor which calls for a significant contribution of funds by the contractor to the work to be performed; the petitioner is deemed essential to the program; and the contract contains a "recovery of cost" provision which allows the Government to receive full reimbursement of monies expended under the contract or any amendment or modification thereto should the new engine be commercially employed.

The work to be performed under the subtask 2.2 of the contract is a cooperative effort in that General Electric will contribute approximately 10 percent of the funds for the design and evaluation of the short-core exhaust concept. Following completion of the NASA program, additional engine testing, flight testing, hardware development, and tooling will be

necessary to bring the concept to the production stage. Petitioner estimates that this additional work will require a G.E. private-funded expenditure of approximately \$4 million. In its efforts to remain competitive in the aircraft engine market, G.E. has spent millions of dollars of private funds in developing and modifying its aircraft engines. In this regard, petitioner points out that it has already spent approximately \$360,000 of its I. R. & D. funds on the short-core exhaust performance improvement concept. In view of the cost-sharing under this contract, and because of petitioner's large expenditures made and to be required for development of the improved CF-6 aircraft engines, the Board finds that the contract calls for a significant contribution of funds by petitioner to the work to be performed.

The petitioner is deemed to be essential to the program of engine fuel reduction if the overall design goals of the ACEE program are to be achieved. The thrust of the work to be performed is to modify an existing G.E. engine which is currently in commercial production. The petitioner was therefore solicited by NASA on the study contract to perform the work on a sole source basis. The subject amendment to the contract was exercised for the convenience of the Government in order to expedite program objectives. A similar parallel program has been entered into with another major supplier of turbine fan engines in the United States; namely, Pratt & Whitney. NASA's overall program objectives are to improve the efficiency of the CF-6 family of commercial aircraft turbine engines, and G.E.'s participation in the program provides some assurance that these goals will be met at an early time.

In addition to the cost-sharing arrangement mentioned above, the petitioner has agreed to a "recovery of cost" provision in the study contract and in all modifications and amendments thereto. This reimbursement feature provides that, in the event of commercial usage of specifically directed improvements, the Government will ultimately receive full reimbursement of monies expended under the contract.

In accordance with the provisions of section 1245.106 of the Patent Waiver Regulations, General Electric has requested waiver of foreign rights in Canada, France, Great Britain, Italy, Japan, and West Germany. G.E. desires waiver of foreign rights in order to protect the use of its technology in the above countries, and to thereby improve its competitive position among foreign manufacturers of aircraft engines. G.E. has long been engaged in the sale of engines to foreign countries for use in military aircraft. In recent years, it has expanded its sales activity throughout the world to also service the commercial aircraft market. In addition to direct selling, G.E.'s gas turbine engine technology is made available to users abroad under patent licensing

agreements. Licensing of technology generally involves the rights to practice many related inventions so that extensive patent portfolios have been developed by G.E. in the turbine engine field. Any inventions arising out of the subject amendment would complement G.E.'s existing group of patented inventions that are available for licensing. Thus, the manufacture of new products in the United States for the foreign market should generate new jobs, and the income from products sales and patent licensing abroad should impact favorably on the U.S. balance of payments. The Board therefore finds that waiver of foreign rights is consistent with the economic interests of the United States.

NASA has determined that the performance of work under the contract may result in the generation of data having significant early commercial potential. NASA's policy "For Early Domestic Dissemination" (FEDD) of technical information and control of the transfer of selected technology to foreign interests is therefore made applicable to the contract. The objective of this policy is to facilitate early domestic dissemination of selected technology having significant early commercial potential in order to assist this Nation in maintaining a leading position in the aerospace and its supporting industries. The control of the transfer of technology abroad is implemented by not disclosing technical information to foreign interests prior to dissemination of such information

in the United States, and by withholding such disclosures sufficiently long after dissemination in the United States to allow U.S. industry to develop a manufacturing and marketing lead.

Petitioner's request for waiver of rights has therefore been considered in the light of the FEDD policy. The Board therefore finds that as to the grant of waiver of domestic and foreign rights to any particular invention, nothing contained in the waiver shall be construed as being inconsistent with the provisions of the FEDD Data Clause of the contract's general provisions, and as to any such waived invention, the petitioner shall take such action as appropriate to fulfill its obligations under the provisions of said FEDD Data Clause. In regard to waiver of foreign rights to any particular invention, the filing of foreign patent applications shall occur not earlier than 11 months from the date of filing of a corresponding U.S. patent application (normally foreign filing is required within 8 months after filing in the United States).

The Board concludes that the interests of the United States would best be served by waiver of rights to all inventions that may be made in the performance of work under subtask 2.2, amendment No. 6 of contract NAS 3-20696, and recommends that the petition for waiver of domestic and foreign rights be GRANTED.

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## NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

PETITIONER: University of Miami  
 INVENTION: A Compact Infrared Turbidity Meter  
 DECISION: Petition GRANTED, Domestic Rights

**PRECEDING PAGE BLANK NOT FILMED****SUBPART 1245.1, NASA Patent Waiver Regulations (1977)**

**PLANS AND INTENTIONS**—Petitioner elicits from licensee a commitment of funds for further development of the invention.

**FINDINGS AND RECOMMENDATION OF THE INVENTIONS AND CONTRIBUTIONS BOARD:**

The petitioner, University of Miami, is a contractor of the National Aeronautics and Space Administration under contract NAS 10-8795. The petition was made for waiver of domestic rights of the United States in the invention described below. The invention was made in the performance of work required under the above-identified contract and in the manner specified in section 305(a) of the National Aeronautics and Space Act of 1958 as determined by the Administrator. The petition was considered by the Inventions and Contributions Board on April 5, 1978.

The Board, having considered the allegations and claims of the petitioner, makes the findings required under section 1245.105(b) of the NASA Patent Waiver Regulations (1977). The Board's findings of fact and recommendation are set forth below.

Section 1245.105(b)(1). The invention relates to a turbidity meter for determining the quality of water. Turbidity or lack of clarity can be measured optically by the subject invention. Specifically, a solid-state laser is used to produce near infrared radiation which is quickly absorbed by the water into which it is directed. Some of this radiation is scattered 180 degrees back along the path of the beam. A semitransparent mirror which passes the illuminating radiation of the laser is used to direct the return beam to a photoreceptive device. The photoreceptor measures the amount of light scattered back, and this quantity is a function of the turbidity of the water under examination. The novel features of the invention include daylight operation, accuracy, and independence of ambient light conditions. The invention was developed under a NASA contract relating to the design of remote sensing laser systems which would operate from the surface of the ocean and eventually from aircraft. Accordingly, the invention is not directly related to a governmental program for creating, developing, or improving products, processes, or methods for use by the general public.

Section 1245.105(b)(2) and section 1245.105(b)(3). The invention relates to a turbidity measuring apparatus which comprises one or more solid-state lasers that operate in the near infrared region. In comparison to commercially available turbidity meters, this apparatus is less complex, it may be contained in a smaller unit, and it is operable during the daylight hours. These advantages represent the major improvement over presently available devices. While the turbidity meter will find application in monitoring water quality, the extraction of impurities or pollutants from the water must be performed by water treatment processes which are functionally separate and distinct from this invention. The invention is therefore not likely to be required by governmental regulations for use by the general public, nor is it deemed to directly concern the public health, public safety, or public welfare.

Section 1245.105(b)(4). The invention is in the field of technology relating to hydrology. More specifically, the invention utilizes an optical means for measuring the scattering coefficient of water in the environment to determine water turbidity. While the Government has sponsored numerous studies concerned with the conditions of fresh water and sea water, presently electrical power companies have become very active in this field in order to comply with environmental regulations regarding temperature and turbidity caused by the discharge of their condenser cooling waters. There are various commercially available turbidity meters which are manufactured by companies servicing the hydrology and oceanography fields. This invention provides mainly a simplified and smaller unit than those presently available and yet yields more accurate data under daylight operation. Although the Government is deemed to have made significant contributions to this field of technology, numerous companies are engaged in the field of hydrology and have acquired significant experience outside of work funded by the Government. Moreover, because functionally alternative devices are available, the acquisition of exclusive

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rights in this invention would not confer on the petitioner a preferred or dominant position.

In view of petitioner's plans and intentions to bring the invention to the point of practical application, the incentive provided by waiver will increase the likelihood that the benefits of the invention would be available to the public at an early date. Petitioner, the University of Miami, is acknowledged for its expertise in hydrology and oceanography. It has therefore established a close relationship with a company involved in the development of water-measuring instruments. In this regard, petitioner is negotiating a licensing arrangement with a manufacturer of products similar to the invention whereby the manufacturer has provisionally committed more than

\$100,000 to develop the invention. The invention will be incorporated into a recording system for the measurement of water parameters that is marketed by the manufacturer. Discussions for the production and marketing for the invention are currently underway with the company. NASA has evaluated the invention and determined that the Government will not fund further development of the turbidity meter. Waiver of rights will therefore provide the incentive for petitioner to continue its efforts to license the invention so that its benefits would be made available to the public at an early time.

The Board concludes that the interest of the United States would best be served by waiver of rights, and recommends that the petition for waiver of domestic rights be GRANTED.

## NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

PETITIONER: General Motors Corporation  
INVENTION: Gas Turbine Combustor Mounting  
DECISION: Petition GRANTED, Domestic and Foreign Rights

## SUBPART 1245.1, NASA Patent Waiver Regulations (1977)

**PLANS AND INTENTIONS**—Invention will find application in GM commercial gas turbine engines.

**FINDINGS AND RECOMMENDATIONS OF THE INVENTIONS AND CONTRIBUTIONS BOARD:**

The petitioner, General Motors Corporation, Detroit Diesel Allison Division, is a contractor of the National Aeronautics and Space Administration under contract NAS 3-20037. The petition was made for waiver of domestic and foreign rights of the United States in the invention described below. The invention was made in the performance of work required under the above-identified contract and in the manner specified in section 305(a) of the National Aeronautics and Space Act of 1958 as determined by the Administrator. The petition was considered by the Inventions and Contributions Board on April 5, 1978.

The Board having considered the allegations and claims of the petitioner, makes all the findings required under section 1245.105(b) and section 1245.106 of the NASA Patent Waiver Regulations (1977). The Board's findings and recommendations are set forth below.

Section 1245.105(b)(1). The invention relates to a gas turbine engine combustor assembly mount within the combustor housing. The novel means of attachment permits axial and radial expansion of the liner, seals the downstream end of a cooling air annulus, avoids degradation of the liner, and permits controlled air flow for cooling the assembly mount. The invention was developed in the course of evaluating advanced combustor liner cooling techniques which meet the requirements of long life at gas temperatures of 1,920° K, and where less than 20 percent of combustion air is used for cooling. Accordingly, the invention is not directly related to a governmental program for creating, developing, or improving products, processes, or methods for use by the general public.

Section 1245.105(b)(2) and section 1245.105(b)(3). The primary commercial application of combustor assemblies is in gas generating turbine engines such as those used in utility power plants and aircraft. The invention is directed specifically to porous metal liner panels that are carried by suitable mounting

means to maintain structured integrity of the combustor by permitting free radial and axial expansion of the panels. As such, the invention is not considered to have a direct or significant impact on the health, safety, or welfare of the general public, nor is it likely to be required by governmental regulations for use by the general public.

Section 1245.105(b)(4). The invention is in the field of technology of combustors. Numerous companies are involved in this technology in connection with gas burner and furnace development. The Government's activity in this field has been limited primarily to space applications and military aircraft development. For example, new designs of combustors were required for rocket engines and, more recently, for advanced aircraft jet engines. The technology of combustors is highly developed as evidenced by the several subclasses of patents which are listed in the U.S. Patent and Trademark Office *Manual of Classification of Patents* and which relate to burners, combustors, and the like. Accordingly, the invention is not in a field of technology in which there has been little significant experience outside of work funded by the Government, or where the Government has been the principal developer of the field, and the acquisition of exclusive rights in the invention would not confer on the petitioner preferred or dominant position.

In view of petitioner's plans and intentions to bring the invention to the point of practical application, the incentives provided by waiver will increase the likelihood that the benefits of the invention would be readily available to the public at an early date. Petitioner, the Detroit Diesel Allison Division of GM, is one of the largest manufacturers of gas generating equipment in the world. GM has an active program which is directed toward the use of combustors in various commercial gas engine applications including commercial helicopter engines. GM intends to incorporate this invention and another related invention (Waiver Case W-1944) in its gas engine designs as well as license others to practice

this technology. Petitioner points out that it has all the necessary facilities to conduct rig tests and engine tests, and its field installations are equipped to evaluate the inventions for performance, service life, and overall acceptability. Waiver of rights would therefore provide the incentive for petitioner to continue its efforts to develop and market the invention for commercial applications.

Petitioner has requested waiver of foreign rights in Japan, Germany, France, Great Britain, Italy, Canada, and Switzerland. Petitioner has stated that the GM Model 501 commercial gas turbine engine is in use in more than 40 countries, and that GM has authorized gas turbine distributorships in 12 foreign countries. GM turbine engines are sold in

the above countries in which waiver is requested. The U.S. manufacture of engines employing the invention would have a favorable impact on the U.S. economy in terms of jobs, and sales of such engines abroad would contribute toward improving the trade posture of the United States. Accordingly, the Board finds, pursuant to section 1245.106 of the Patent Waiver Regulations, that waiver of foreign rights is consistent with the economic interests of the United States.

The Board concludes that the interests of the United States would best be served by waiver of rights, and recommends that the petition for waiver of domestic and foreign rights be GRANTED.



## NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

PETITIONER: University of Denver  
 INVENTION: Temperature Monitor  
 DECISION: Petition GRANTED, Domestic and Foreign Rights

## SUBPART 1245.1, NASA Patent Waiver Regulations (1977)

**PUBLIC HEALTH SECTION 1245.105(b)(3)—Essential component of body monitoring system (Vital Signs Monitor) found to directly concern public health.**

**WAIVER AS NECESSARY INCENTIVE SECTION 1245.105(c)—Contractor will support R. & D. and seek licensees for production and sale.**

**SPECIAL CONDITION ON WAIVER—Circuit component will be furnished by NASA for other applications; waiver made subject to the condition that contractor and its licensees shall meet market demand, otherwise NASA may license the invention to ensure that any such demand is satisfied.**

## FINDINGS AND RECOMMENDATIONS OF THE INVENTIONS AND CONTRIBUTIONS BOARD:

The petitioner, University of Denver, is a contractor of the National Aeronautics and Space Administration under contract NAS 9-15206. The petition was made for waiver of domestic and foreign rights of the United States in the invention described below. The invention was made in the performance of work required under the above-identified contract and in the manner specified in section 305(a) of the National Aeronautics and Space Act of 1958 as determined by the Administrator. The petition was considered by the Inventions and Contributions Board on June 29, 1978.

The Board, having considered the allegations and claims of the petitioner is unable to make all of the findings required under section 1245.105(b) of the NASA Patent Waiver Regulations (1977). Specifically, the invention is found under section 1245.105(b)(3) of the Regulations to directly concern the public health. The Board, however, recommends grant of waiver of domestic rights as provided by section 1245.105(c) of the Regulations on its further finding that waiver is a necessary incentive to call forth risk capital and expense to bring the invention to the point of practical application. The Board also finds pursuant to section 1245.106 of the Regulations that waiver of foreign rights is consistent with the economic interests of the United States. The Board's findings of fact and recommendations are set forth below.

The invention, a temperature monitoring circuit, is an essential component of a Vital Signs Monitor which is a device for measuring and displaying, by

electronic means, body temperature, pulse rate, ECG (electrocardiogram), and breath rate. The monitoring system comprises six miniaturized hybrid electronic circuits which are the basic building blocks of the device. These circuits are interrelated to perform a unique data processing and signal conditioning function, and are known as: (1) heart/breath rate processor, (2) impedance pneumograph respiration rate, (3) clock or master frequency, (4) LCD display driver, (5) ECG and cardiometer signal conditioner, and (6) temperature monitor (the subject invention). Waiver of rights has also been requested for the Vital Signs Monitor system and for each of the hybrid circuit inventions.

The Vital Signs Monitor in its final form will be portable, battery operated, and sized to a hand-held calculator. The monitoring system comprises a temperature probe for measuring the body temperature and three electrodes for producing both ECG and respiration signals. The device may also be provided with a plug or socket for receiving signals from blood-pressure sensing devices. Briefly, the ECG monitor amplifies a signal detected by electrodes which are placed on the body of a patient undergoing medical examination. The ECG output signal is supplied to the impedance pneumograph which measures the change in impedance of the chest as it expands and contracts during the breathing cycle. The output from the impedance pneumograph is supplied to the heart/breath processor module whose circuitry is designed to convert the time between pulses generated by either the ECG amplifier or impedance pneumograph to determine the heart rate

in beats per minute. This circuit is also used to determine the respiration rate by shunting the control frequencies that are generated by a clock circuit. The heart rate can be determined beat-to-beat or from the average of five consecutive heart beats. The clock circuitry is a small crystal which provides all the control frequencies for operation of the system. The temperature monitor circuit converts the resistance of a thermistor to a voltage which exhibits a linear correspondence to temperature; this voltage is then converted to a digital value. The LCD display driver pertains to digital display of the signals which are supplied by the above circuitry. These hybrid circuits are considerably more reliable than conventional printed circuits due to the elimination of solder joints and electrical connections. Because the circuits operate on a very low voltage and current, there are no electrical hazards inherent in the system. The Vital Signs Monitor is especially suited to emergency medical diagnosis at remote locations or in cramped, inaccessible places because of its compact size, low power consumption, and physiological data acquisition and processing capabilities. These features will be especially valuable in recording combinations of physiological data at the scene of accidental fires, explosions, gas leakages, etc., where medical histories could be used as a basis for providing better medical treatment. The monitoring device will also find application as an instrument of a physician's bag where clinical quality measurements are desired. Inasmuch as the subject temperature monitoring circuit is an integral part of the Vital Signs Monitor, the Board finds pursuant to section 1245.105(b)(3) of the Patent Waiver Regulations that the invention directly concerns the public health.

The Board, having considered the relationship of the invention to the health, safety, and welfare of the general public, nevertheless finds pursuant to section 1245.105(c) of the Patent Waiver Regulations that waiver is a necessary incentive to call forth risk capital and expense to bring the invention to the point of practical or commercial application. Petitioner is a university and therefore it does not have a manufacturing capability. Consequently, it intends to license the monitoring device and its hybrid circuitry to a manufacturer so that they might be further developed, produced, and sold in the commercial market. In accordance with petitioner's plans and intentions to place the inventions in the stream of commerce, initial development and marketing analysis costs will be shared by the university and the licensee. In this regard, petitioner, in cooperation with its licensing agent, University Patents, Incorporated, has prepared a list of candidate manufacturers from which selected companies will be offered a license including guidance and assistance to expedite development and commercialization of the inventions. Specifically, a product evaluation will be

performed by petitioner in connection with clinical data received. Petitioner will also conduct or assist in conducting market surveys and cost analysis to enable candidate manufacturers to assess the risk of placing a new product on the market. Petitioner estimates that the cost of development of the Vital Signs Monitor in the United States during the first year may require \$100,000 of university funds for clinical testing, and \$20,000 for initial product development from the manufacturer. In the second year, the university is expected to expend \$35,000 while \$70,000 may be expected from the manufacturer. In the third year when development will have been completed, no university expenditures are anticipated; however, all manufacturing costs will be borne by the licensee-manufacturer. It is estimated that the total cost of development for both the United States and foreign markets may exceed \$400,000. Petitioner has already contacted several fabricators of hybrid microcircuits which are expected to furnish the hybrid circuitry for the Vital Signs Monitor to a larger product-oriented organization having sales experience and a product line of medical instrumentation. In view of the large capital expenditure required to bring the inventions to the point of practical application, the Board finds that waiver would provide the incentive for petitioner to continue its efforts to further develop the subject invention as well as to negotiate licenses which will require a commitment of funds by interested manufacturers.

NASA, through its technology utilization programs, intends to demonstrate the feasibility of the six miniaturized hybrid circuit components in the fabrication of a Portable Medical Status Treatment System, sometimes referred to as a "High Technology Physician's Black Bag." This bag will contain modules of electronic instrumentation so that a complete diagnosis of a patient may be performed in relatively short time. The hybrid circuits which were made by petitioner under the subject contract will be furnished to another contractor which has been selected to fabricate prototypes of such physician's bag. Thus, should the Portable Medical Status Treatment System become in great demand, fabricators of the system should not be frustrated by the unavailability of the hybrid circuits if petitioner or its licensees are unable to meet market demand (waivers having been granted to petitioner for each of the component circuits). To ensure that any such demand is satisfied, the Board recommends that in any grant to waiver, petitioner, its licensees or assigns shall offer the temperature monitoring circuit for sale or make it available for sale to any interested party at a reasonable price and in quantities sufficient to meet market demand. In the event of noncompliance with such condition, NASA reserves the right to grant licenses for the practice of the invention.

The Vital Signs Monitor is deemed to have significant commercial value in foreign markets as well as in the domestic market. Accordingly, petitioner has requested waiver of rights to the subject invention in Canada, France, Great Britain, Italy, Japan, Norway, Sweden, and West Germany. In view of a potentially wide market for the monitoring system, foreign patent rights are of considerable importance in petitioner's licensing strategy. Petitioner expects that any licensing abroad would be performed by an American licensee which would operate through a

subsidiary to manufacture items abroad or sublicense to foreign nationals. Direct sales abroad may also be made. Marketing the invention abroad would impact favorably on the U.S. economy in terms of sales or license income. Accordingly, the Board finds that waiver of foreign rights is consistent with the economic interests of the United States.

The Board concludes that the interests of the United States would best be served by waiver of rights, and recommends that the petition for waiver of domestic and foreign rights be GRANTED.

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## NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

PETITIONER: University of Denver  
 INVENTION: Vital Signs Monitor  
 DECISION: Petition GRANTED, Domestic and Foreign Rights

## SUBPART 1245.1, NASA Patent Waiver Regulations (1977)

**PUBLIC HEALTH SECTION 1245.105(b)(3)—Monitoring system for electronically measuring and displaying body parameters found to directly concern public health.**

**WAIVER AS NECESSARY INCENTIVE SECTION 1245.105(c)—Contractor will continue its support for further research and development and seek licensees for production and sale.**

**SPECIAL CONDITIONS ON WAIVER—Invention circuit components will be furnished by NASA for other applications; waiver made subject to condition that contractor and its licensees shall meet market demand, otherwise NASA may license the invention to ensure that any such demand is satisfied.**

## FINDINGS AND RECOMMENDATIONS OF THE INVENTIONS AND CONTRIBUTIONS BOARD:

The petitioner, University of Denver, is a contractor of the National Aeronautics and Space Administration under contract NAS 9-15206. The petition was made for waiver of domestic and foreign rights of the United States in the invention described below. The invention was made in the performance of work required under the above-identified contract and in the manner specified in section 305(a) of the National Aeronautics and Space Act of 1958 as determined by the Administrator. The petition was considered by the Inventions and Contributions Board on June 29, 1978.

The Board, having considered the allegations and claims of the petitioner, is unable to make all of the findings required under section 1245.105(b) of the NASA Patent Waiver Regulations (1977). Specifically, the invention is found under section 1245.105(b)(3) of the Regulations to directly concern the public health. The Board, however, recommends grant of waiver of domestic rights as provided by section 1245.105(c) of the Regulations on its further finding that waiver is a necessary incentive to call forth risk capital and expense to bring the invention to the point of practical application. The Board also finds pursuant to section 1245.106 of the Regulations that waiver of foreign rights is consistent with the economic interests of the United States. The Board's findings of fact and recommendations are set forth below.

The invention, known as a Vital Signs Monitor, is a device for measuring and displaying, by electronic means, body temperature, pulse rate, ECG (electrocardiogram), and breath rate. The monitoring sys-

tem comprises six miniaturized hybrid electronic circuits which are the basic building blocks of the device. These circuits perform a unique data processing and signal conditioning function, and are known as the (1) heart/breath rate processor, (2) impedance pneumograph respiration rate, (3) clock or master frequency, (4) LCD display driver, (5) ECG and cardiometer signal conditioner, and (6) temperature monitor. Waiver of rights has also been requested for each of these hybrid circuit inventions.

The Vital Signs Monitor in its final form will be portable, battery operated, and sized to a hand-held calculator. The monitoring system comprises a temperature probe for measuring the body temperature, and three electrodes for producing both ECG and respiration signals. The device may also be provided with a plug or socket for receiving signals from blood-pressure sensing devices. Briefly, the ECG monitor amplifies a signal detected by electrodes which are placed on the body of a patient undergoing medical examination. The ECG output signal is supplied to the impedance pneumograph which measures the change in impedance of the chest as it expands and contracts during the breathing cycle. The output from the impedance pneumograph is supplied to the heart/breath processor module whose circuitry is designed to convert the time between pulses generated by either the ECG amplifier or impedance pneumograph to determine the heart rate in beats per minute. This circuit is also used to determine the respiration rate by shunting the control frequencies that are generated by a clock circuit. The heart rate can be determined beat-

to-beat or from the average of five consecutive heart beats. The clock circuitry is a small crystal which provides all the control frequencies for operation of the system. The temperature monitor circuit converts the resistance of a thermistor to a voltage which exhibits a linear correspondence to temperature; this voltage is then converted to a digital value. The LCD display driver pertains to digital display of the signals which are supplied by the above circuitry. These hybrid circuits are considerably more reliable than conventional printed circuits due to the elimination of solder joints and electrical connections. Because the circuits operate on a very low voltage and current, there are no electrical hazards inherent in the system. The Vital Signs Monitor is especially suited to emergency medical diagnosis at remote locations or in cramped inaccessible places because of its compact size, low power consumption, and physiological data acquisition and processing capabilities. These features will be especially valuable in recording combinations of physiological data at the scene of accidental fires, explosions, gas leakages, etc., where medical histories could be used as a basis for providing better medical treatment. The device will also find application as an instrument of a physician's bag where clinical quality measurements are desired. In view of the above, the Board finds pursuant to section 1245.105(b)(3) of the Patent Waiver Regulations that the invention directly concerns the public health.

The Board, having considered the relationship of the invention to the health, safety, and welfare of the general public, nevertheless finds pursuant to section 1245.105(c) of the Patent Waiver Regulations that waiver is a necessary incentive to call forth risk capital and expense to bring the invention to the point of practical or commercial application. Petitioner is a university and therefore it does not have a manufacturing capability. Consequently, it intends to license the monitoring device to a manufacturer so that it might be further developed, produced, and sold in the commercial market. In accordance with petitioner's plans and intentions to place the invention in the stream of commerce, initial development and marketing analysis costs will be shared by the university and the licensee. In this regard, petitioner, in cooperation with its licensing agent, University Patents, Incorporated, has prepared a list of candidate manufacturers from which selected companies will be offered a license including guidance and assistance to expedite development and commercialization of the invention. Specifically, a product evaluation will be performed by petitioner in connection with clinical data received. Petitioner will also conduct or assist in conducting market surveys and cost analysis to enable candidate manufacturers to assess the risk of placing a new product on the market. Petitioner estimates that the cost of development in the United States during the first year may require

\$100,000 of university funds for clinical testing, and \$20,000 for initial product development from the manufacturer. In the second year, the university is expected to expend \$35,000 while \$70,000 may be expected from the manufacturer. In the third year when development will have been completed, no university expenditures are anticipated; however, all manufacturing costs will be borne by the licensee-manufacturer. It is estimated that the total cost of development for both the United States and foreign markets may exceed \$400,000. Petitioner has already contacted several fabricators of hybrid microcircuits which technology is required for the Vital Signs Monitor. These companies are expected to furnish the hybrid circuitry to a larger product-oriented organization having sales experience and a product line of medical instrumentation. In view of the large capital expenditure required to bring the invention to the point of practical application, the Board finds that waiver would provide the incentive for petitioner to continue its efforts to further develop the invention as well as to negotiate licenses which will require a commitment of funds by interested manufacturers.

NASA, through its technology utilization programs, intends to demonstrate the feasibility of the six miniaturized hybrid circuit components of the invention in the fabrication of a Portable Medical Status Treatment System, sometimes referred to as a "High Technology Physician's Black Bag." This bag will contain modules of electronic instrumentation so that a complete diagnosis of a patient may be performed in relatively short time. The hybrid circuits which were made under the subject contract with petitioner will be furnished to another contractor which has been selected to fabricate prototypes of such physician's bag. Thus, should the Portable Medical Status Treatment System become in great demand, fabricators of the system should not be frustrated by the unavailability of the hybrid circuits if petitioner or its licensees are unable to meet market demand (waivers having been granted to petitioner for each of the component circuits). To ensure that any such demand is satisfied, the Board recommends that in any grant to waiver, petitioner, its licensees or assigns shall offer the hybrid circuit components of the invention for sale or make them available for sale to any interested party at a reasonable price and in quantities sufficient to meet market demand. In the event of noncompliance with such condition, NASA reserves the right to grant licenses for the practice of the hybrid circuit inventions.

The Vital Signs Monitor is deemed to have significant commercial value in foreign markets as well as in the domestic market. Accordingly, petitioner has requested waiver of rights in Canada, France, Great Britain, Italy, Japan, Norway, Sweden, and West

Germany. In view of a potentially wide market for the invention, foreign patent rights are of considerable importance in petitioner's licensing strategy. Petitioner expects that any licensing abroad would be performed by an American licensee which would operate through a subsidiary to manufacture items abroad or sublicense to foreign nationals. Direct sales abroad may also be made. Marketing the invention abroad would impact favorably on the U.S.

economy in terms of sales or license income. Accordingly, the Board finds that waiver of foreign rights is consistent with the economic interests of the United States.

The Board concludes that the interests of the United States would best be served by waiver of rights, and recommends that the petition for waiver of domestic and foreign rights be GRANTED.





## NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

PETITIONER: Warren and Williams Associates, Inc.  
 INVENTION: Solar Energy Compensator System  
 DECISION: Petition GRANTED, Domestic and Foreign Rights

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## SUBPART 1245.1, NASA Patent Waiver Regulations (1977)

**PLANS AND INTENTIONS**—Minority small business concern requires exclusivity in the invention to attract investment capital; R. & D. of the invention continues.

**WAIVER OF FOREIGN RIGHTS SECTION 1245.106**—Petitioner intends to manufacture the invention in the United States for sale abroad.

**FINDINGS AND RECOMMENDATIONS OF THE INVENTIONS AND CONTRIBUTIONS BOARD:**

The petitioner, Warren and Williams Associates, Inc., is a contractor of the National Aeronautics and Space Administration under KSC-NASA contract CC 60966A. The petition was made for waiver of domestic and foreign rights of the United States in the invention described below. The invention was made in the performance of work required under the above-identified contract and in the manner specified in section 305(a) of the National Aeronautics and Space Act of 1958 as determined by the Administrator. The petition was considered by the Inventions and Contributions Board on June 29, 1978.

The Board, having considered the allegations and claims of the petitioner, makes the findings required under section 1245.105(b) and section 1245.106 of the NASA Patent Waiver Regulations (1977). The Board's findings of fact and recommendations are set forth below.

Section 1245.105(b)(1). The invention relates to an automatic demand lighting system which is controlled by a photo cell that measures the intensity of the combined sunlight and artificial light. More specifically, lights in a room are wired in sets determined by the amount of artificial light that is needed in different parts of the room for various levels of sunlight. The system is designed to automatically maintain a minimum selected light level in structures containing windows. As sunlight is increased within the structure, the artificial light is appropriately reduced to maintain a preselected light level within a predetermined intensity range. The invention resulted from work performed at the Kennedy Space Center to develop, construct, and demonstrate a demand illumination control system which automatically maintains a minimum selected light level in offices containing windows. An electromechanical demand lighting device was investigated under the contract for its practical application. Petitioner

modified the electromechanical device and designed a total solid-state electronic demand lighting system. Although the invention may have application in any building where sunlight enters through windows or the like, the invention resulted from a specific work task relating to the Kennedy Space Center building structures. Accordingly, the invention is not directly related to a governmental program for creating, developing, or improving products, processes, or methods for use by the general public.

Section 1245.105(b)(2) and section 1245.105(b)(3). The invention, an automatic demand lighting system, is the electronic equivalent of an existing electromechanical device which performs the same function. The electronic system, however, may be produced at lower cost, and its physical size is considerably smaller than the electromechanical unit. While such devices may reduce the consumption of electrical energy by the gradual reduction of artificial light as solar generated light is increased, any energy so saved may be significant only if the lighting system is widely used. Presently, there are no known governmental regulations which require the use of such devices by the general public. The Board therefore finds that the invention does not directly concern the public health, public safety, or public welfare, nor is it likely to be required by governmental regulations for use by the general public.

Section 1245.105(b)(4). The invention is in the field of technology of electronic circuitry as it relates to automatic control operation. This technology is highly developed as evidenced by control operations in industry, chemical processing, production automation, and other areas too numerous to mention. Because of the need for space-saving and fast-switching controls, electronic systems have, to a large extent, replaced their mechanical equivalent.

In the subject case, an electromechanical demand lighting system has been modified and converted to a functionally equivalent electronic system. Clearly, the invention is not in a field of technology in which there has been little significant experience outside of work funded by the Government or where the Government has been a principal developer of the field, and the acquisition of exclusive rights in the invention is not likely to confer on the petitioner a preferred or dominant position.

In view of the petitioner's plans and intentions to bring the invention to the point of practical application, the incentive provided by waiver will increase the likelihood that the benefits of the invention will be readily available to the public at an early date. The petitioner is a minority small business concern which already has embarked on the commercialization of the invention. Specifically, a brochure on the invention has been prepared and distribution thereof is in progress. Petitioner has also made additional modifications to the device as reported under the NASA contract. Petitioner plans to initiate production in its present facility which it feels has the capacity to produce sufficient units to meet immediate demand for the invention. Materials and parts suppliers have been located, and assembly personnel are being recruited. Petitioner finds that the type of work involved is particularly adaptable to the handicapped and a search has been made in the local community for such workers. Petitioner, because of its small business status, urges that waiver be

granted as exclusivity in the invention is essential if it is to secure private financing. To this end, petitioner has discussed financing locally with several banks, and it estimates that initial development and commercialization may require as much as \$40,000. In view of the above, waiver of rights would provide the incentive for petitioner to continue its efforts to work the invention so that its benefits would be made available to the public at an early time.

Section 1245.106. Petitioner has requested waiver of foreign rights in Japan, Great Britain, France, West Germany, and Canada. While petitioner is not engaged in any of the above countries in the sale of products and/or services that are related to the field of technology of the invention, it plans to manufacture the invention in the United States, and export it to foreign countries for commercial marketing. Should the invention be found to be cost effective, a large number of units sold could have an impact on the balance of payments, and widespread use in the United States could result in a decrease in petroleum imports. Accordingly, waiver of foreign rights is consistent with the economic interests of the United States.

The Board concludes that the interests of the United States would best be served by waiver of rights, and recommends that the petition for waiver of domestic and foreign rights be GRANTED.

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## NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

PETITIONER: Texas Instruments Incorporated  
 CONTRACT: Simultaneous, Multiple, Independently Steered Beam Study for Airborne Electronically Steerable Phased Array Program.  
 DECISION: Petition GRANTED, Domestic Rights

## SUBPART 1245.1, NASA Patent Waiver Regulations (1977)

**WAIVER UNDER FOLLOW-ON CONTRACT**—Waiver under follow-on contract is determined by the scope of work and principal purpose of the contract.

## FINDINGS AND RECOMMENDATION OF THE INVENTIONS AND CONTRIBUTIONS BOARD:

The petitioner, Texas Instruments, Incorporated, is a prospective contractor of the National Aeronautics and Space Administration under contract proposal No. 8-18-EC-14332-AP25J. The petition was submitted to NASA prior to contract execution for waiver of domestic rights to all inventions that may be made under any contract awarded on the above-identified proposal. The petition was considered by the Inventions and Contributions Board on June 26, 1978.

The Board, having considered the allegations and claims of the petition, makes the findings for waiver of domestic rights under section 1245.104(c) and (d) of the NASA Patent Waiver Regulations (1977). The Board's findings and recommendation are set forth below.

Section 1245.104(c)(1). The purpose of the proposed contract is to develop an engineering model of a multiple beam airborne electronically steerable phased array antenna. The work to be performed is directed toward development of an engineering model which will be used for verification test purposes. Preliminary design of the antenna was performed under an earlier NASA contract (NAS 8-32627), and the present effort is a continuation of that work. The model will include a 19-element, 2-dimensional J-bond array. The antenna is intended for use in the communications systems of the space station/space base, relay satellites, and space transportation system where adoptive, electronically steerable pointing and tracking of communications beams are required. Clearly, it is not a principal purpose of the proposed contract to create, develop, or improve products, processes, or methods which are intended for commercial use (or which are otherwise intended to be made available for use) by the general public, or which will be required for such use by governmental regulations.

Section 1245.104(c)(2). The principal purpose of the proposed contract is to develop phased arrays

for space communications systems. Such devices will find application in antenna equipment to be used on orbiting artificial satellites, space stations, space vehicles, and the like. The work to be performed does not have a direct or significant impact on the health, safety, or welfare of the general public. It is therefore not a principal purpose of the proposed contract to explore into fields which directly concern the public health, public safety, or public welfare.

Section 1245.104(c)(3). The proposed contract is in the field of antenna technology. The field of antennas has been under development since the advent of radio. In the more specific area of microwaves, primitive microwave antennas were developed in the 1930's. In the area of phase array antennas, many of the principal developments leading up to the proposed contract effort have been funded by the Government; however, private industry has been active in this area as evidenced by the phased array developments of petitioner, General Electric, Hughes Electronics, and Airborne Instruments Laboratory. Texas Instruments is acknowledged as having in-depth knowledge, experience, and the expertise to develop electronically steerable arrays. Numerous sources of antennas are listed in trade publications, and various designs may be identified from the numerous patents which have been issued over the years. Accordingly, the Board finds that the proposed contract is not in a field of science or technology in which there has been little significant experience outside of work funded by the Government, or where the Government has been the principal developer of the field, and the acquisition of exclusive rights at the time of contracting is not likely to confer on the petitioner a preferred or dominant position.

Section 1245.104(c)(4). The petitioner will furnish the necessary personnel, facilities, and equipment to perform the contract work. The proposed contract therefore is not for the services of the petitioner for (i) the operation of a Government-owned

research or production facility, or (ii) coordinating and directing the work of others.

Section 1245.104(d)(1). The principal purpose of the proposed contract is to develop an engineering model of an antenna which will be used for verification test purposes. Final design of a phased array antenna will have application in space communications systems such as those associated with space satellites, space stations, or a space base. Clearly, the purpose of the proposed contract is to build upon existing knowledge or technology to develop information, products, processes, or methods for use by the Government.

Section 1245.104(d)(2). Petitioner has acquired extensive technical competence in the field of antennas by virtue of its development and sales of radar systems and its earlier work on phased arrays. Petitioner's efforts in this area include development of microwave integrated circuits and filter and

radiating elements, as well as testing and fabrication of electronic components for phased arrays. Petitioner is considered to have greater indepth knowledge, experience, and ability than most other companies working in the area of phased arrays. The work to be performed under the proposed contract is closely related to TI's privately funded research and development programs; this is demonstrated by petitioner's patent position which comprises numerous patents covering its Airport Surveillance Radar Systems. In view of the above, the work called for by the proposed contract is in a field of technology in which petitioner has acquired technical competence directly related to an area in which it has an established nongovernmental commercial position.

The Board concludes that the interests of the United States would best be served by waiver of rights to all inventions that may be made under the proposed contract, and recommends that the petition for waiver of domestic rights be GRANTED.

## APPENDIX B: LIST OF WAIVER PETITIONS—FINDINGS OF FACT NOT DIGESTED (1966 Regulations)

The Findings of Fact of the Inventions and Contributions Board for the waiver cases listed below are not digested in this booklet, since the rationale for these waiver decisions are similar to that of other decisions which already have been digested. The waiver numbers listed below that are prefixed by the letter W refer to waivers for identified inventions, and those prefixed by the letters BW refer to waiver to all inventions made under a contract.

Inquiries concerning the waiver cases listed below should be made to the National Aeronautics and Space Administration, Inventions and Contributions Board, Code NB-9, Washington, D.C. 20546.

<i>Waiver Case Number</i>	<i>Petitioner</i>	<i>Invention or Contract</i>	<i>Disposition</i>
W-727	Electric Storage Battery Co.	Heat Sterilizable Sealed Silver-Zinc Battery using Lead Sulfide and Mercuric Sulfide in the Zinc Electrode	Granted
W-728	Do.	Heat Sterilizable Sealed Silver-Zinc Battery using Lead Sulfide in the Zinc Electrode	Do.
W-729	Do.	Heat Sterilizable Sealed Silver-Zinc Battery using Mercuric Sulfide in the Zinc Electrode	Do.
W-742	General Technologies Corporation	A High Strength, Whisker-Reinforced Metallic Monofilament	Do.
BW-810	Systems Technology, Inc.	Fabricate and Develop Mark IIA Critical Task Tester and Battery of Tests Therefor	Do.
W-816	United Aircraft Corporation	Transformer Regulated Self-Stabilizing Chopper	Do.
W-847	Thermo Electron Corporation	Introducing Oxygen as an Additive Into a Thermionic Converter	Do.
W-868	Massachusetts Institute of Technology	Electrohydrodynamic Apparatus and Method	Do.
W-871	TRW, Incorporated	Polyimide Polymers	Do.
W-872	General Precision Systems, Inc.	Beam Alignment	Do.
W-875	Harvey Aluminum, Inc.	Aluminum-Steel Composite	Do.
BW-878	Atlantic Research Corporation & Victory Engineering Corp.	Development of a Thin Film Temperature Sensor for Upper Atmospheric Soundings	Do.
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<i>Waiver Case Number</i>	<i>Petitioner</i>	<i>Invention or Contract</i>	<i>Disposition</i>
W-886	Giannini Scientific Corporation	Electric Arc Light Having Undercut Recessed Anode	Granted
W-887	Raytheon Company	Sealed Relay	Do.
BW-889	General Precision Systems, Inc.	Development of Improved Solar Cell Electrical Contacts	Do.
W-890	TRW, Incorporated	Polyimide Molding Power Compositions	Do.
W-891	The Borden Company	Separator for Alkaline Electric Batteries	Do.
W-892	Do.	Separator for Alkaline Battery	Do.
W-893	Westinghouse Electric Corporation	Low Power Analog Switch	Do.
BW-895	Hughes Aircraft Company	Analytical Study Program to Develop the Theoretical Design of Traveling Wave Tubes	Denied
W-898	Do.	Investigate the Thrust Vector of an Electron Bombardment Ion Engine	Granted
W-902	CBS Laboratories	Method for Producing Dimensionally Stable Photosensitive Resist Pattern	Do.
W-903	Do.	Method for Producing Reliable Contacts Between Resistors and Low Resistivity Materials	Do.
W-904	Do.	Method for Restoring the Electrical Properties of Ion Bombarded Semiconductor Devices	Do.
W-905	The Borden Company	Separator for Alkaline Electric Cells	Do.
W-906	Do.	Separator for Alkaline Electric Batteries	Do.
W-907	Do.	Do.	Do.
BW-909	Westinghouse Electric Corporation	Program for Development of High Temperature Electrical Materials	Do.
W-911	North American Rockwell Corporation	Locking Mechanism	Do.

**LIST OF WAIVER PETITIONS—FINDINGS OF FACT NOT DIGESTED—Continued  
(1972 Regulations)**

<i>Waiver Case Number</i>	<i>Petitioner</i>	<i>Invention or Contract</i>	<i>Disposition</i>
W-1770	General Electric Company/ Aircraft Engine Group	Leading Edge Protection for Composite Blades	Granted
W-1771	Do.	Deformable Bearing Seat	Do.
W-1772	Do.	Closeout Bridging Strip for Composite Structures	Do.
W-1773	Do.	Digital Fuel Control System	Do.
W-1774	Do.	Blade Retainer	Do.
W-1775	Do.	Fail-safe Servo Valve	Do.
W-1776	Rockwell International Corporation	Multiple Bubble Detector	Do.
AW-1777	RCA Corporation	Research on the Development of Room Temperature Operation- Visible Emission Semiconductor Diode Lasers	Do.
AW-1778	Laser Development Corporation	Development of Tunable High Pressure CO <sub>2</sub> Laser for Studies of Differential Absorption Sens- ing of Pollutants and Energy Transmission	Denied
AW-1779	IIT Research Institute	Engineering Support for Magnetic Tape Recording	Granted, Domestic; Denied, Foreign
W-1782	Westinghouse Electric Corporation	Improved Gate Assisted Thyristor, and a Method Including Cathode Shunts	Granted
AW-1784	Sprague Electric Company	Design, Develop, Fabricate, and Test Wet-Slug All-Tantalum Capacitors in the T2 Case Size	Do.
W-1786	California Institute of Technology	Automated Mass Spectrometer Analysis System	Do.
W-1788	Nelson and Johnson Engineering, Inc.	Trash Compactor, Manual	Do.
AW-1789	Texas Instruments, Incorporated	Electrostatic Focused Intensified Charge Coupled Devices (EFICCD)	Do.
W-1790	California Institute of Technology	X-ray Exposure Sensor and Controller	Do.
W-1791	Do.	Polymers and Method of Preparation	Do.

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**LIST OF WAIVER PETITIONS—FINDINGS OF FACT NOT DIGESTED—Continued  
(1972 Regulations)**

<i>Waiver Case Number</i>	<i>Petitioner</i>	<i>Invention or Contract</i>	<i>Disposition</i>
W-1794	General Electric Company	Redundant Disc	Granted
W-1795	California Institute of Technology	Sewage Sludge Treatment System	Do.
W-1796	Do.	Improvement in Sewage Sludge Additive	Do.
W-1797	Do.	Improvement in Raw Sewage Treatment	Do.
AW-1800	Union Carbide Corporation	High-Purity Silicon Project	Do.
W-1801	California Institute of Technology	Isotope Separation Using Metallic Vapor Lasers	Denied
W-1802	Do.	Cell Specific, Variable Density, Polymer Microspheres	Granted
W-1803	Do.	Photochemical Preparation of Olefin Addition Catalysts	Do.
W-1804	Do.	Polyvinyl Pyridine Microspheres	Do.
W-1805	Do.	Preparation of Small, Bio-compatible Microspheres	Do.
AW-1808	RCA Corporation	Development of Ion-Implantation Techniques	Do.
W-1809	Massachusetts Institute of Technology	Bilateral D.C.-to-D.C. Voltage Converter	Do.
W-1810	General Electric Company/ Aircraft Engine Group	Composite Wall Structure	Do.
W-1811	Do.	Sound Suppressing Structure with Thermal Relief	Do.
W-1812	Do.	Blind Thread Inserts	Do.
W-1813	Do.	Positioning Pad for a Swing Root Composite Blade	Do.
W-1814	General Electric Company/ Aircraft Engine Group	Fan Nozzle Actuated by Multiple Tubes	Do.
W-1815	Do.	Acoustic Wall Structure	Do.
W-1816	Do.	Clamshell Reverser Articulating Side Extension and Actuation System for Same	Do.



**LIST OF WAIVER PETITIONS—FINDINGS OF FACT NOT DIGESTED—Continued  
(1972 Regulations)**

<i>Waiver Case Number</i>	<i>Petitioner</i>	<i>Invention or Contract</i>	<i>Disposition</i>
AW-1820	Texas Instruments Incorporated	Study to Determine the Feasibility of Eliminating Single Failure Point Sources in the Scout Guidance System	Granted
W-1822	California Institute of Technology	Multispectral Imaging and Analysis System	Denied
W-1824	Atul Jain	Super-Resolution Imaging System	Granted
AW-1826	RCA Corporation	Electrodynamics Explorer Instrument Payload Study	Do.
W-1829	California Institute of Technology	Plasma Igniter for Internal Combustion Engine	Denied
W-1830	Do.	Selective Image Area Control of X-ray Film Exposure Density	Do.
W-1831	Do.	Medical Tomographic System Using Ultra-Sonic Transmission	Granted
AW-1834	E. I. DuPont de Nemours and Co., Inc.	NR-150B2 Adhesive Development	Do.
AW-1835	Litton Systems, Inc., Guidance and Control Systems Division	Dry Inertial Reference Unit	Do.
W-1837	Massachusetts Institute of Technology	Gasification Process	Do.
W-1839	Rockwell International Corporation	High Frequency Arc Cleaning Process and Wire Cleaner	Do.
W-1840	General Electric Company/Aircraft Engine Group	Reverse Pitch Fan with Divided Splitter	Do.
AW-1841	Kimberly-Clark Corporation	Alkaline Battery Separator Development	Do.
W-1843	California Institute of Technology	Startup System for Hydrogen Generator Used with an Internal Combustion Engine	Denied
W-1845	Westinghouse Electric Corporation	Suppression of Parametric Oscillations in IMPATT Amplifiers and Oscillators	Granted
W-1846	University of Arizona	Rock Burst Alarm System	Do.
W-1848	International Business Machines Corporation	Method and Apparatus for Forming an Elongated Silicon Crystalline Body Using a 110, 211 Oriented Seed Crystal	Do.

**LIST OF WAIVER PETITIONS—FINDINGS OF FACT NOT DIGESTED—Continued  
(1972 Regulations)**

<i>Waiver Case Number</i>	<i>Petitioner</i>	<i>Invention or Contract</i>	<i>Disposition</i>
W-1849	International Business Machines Corporation	Method and Apparatus for Forming Silicon Crystalline Bodies	Granted
W-1851	The Singer Company, Link Division	Simulated Lights for an Airfield Model	Do.
W-1852	Arthur W. Authier	Solar Altitude Computer	Do.
AW-1853	SKF Industries, Inc.	Ferrofluid Lubrication Study and Bearing Test Fixture Development	Do.
AW-1854	Desert Sunshine Exposure Tests, Inc.	Solar Cells Tests	Do.
W-1857	Dr. Thomas G. Wilson and William W. Burns, III	A System State and Operating Condition Sensitive Control Technique for Electronic Power Processing Systems	Do.
W-1858	Westinghouse Electric Corporation	Multi-Mode Control Logic Circuit for Solid-State Relays	Do.
W-1859	Do.	Control Circuit Initiating Conduction of an Opto-Isolator Unit	Do.
W-1860	TRW, Inc., Systems and Energy	Perfluoroisopropylidene Diamine	Do.
W-1862	California Institute of Technology	Metal Containing Polymeric Functional Microspheres	Do.
W-1863	Do.	Impregnated Metal-Polymeric Functional Beads	Do.
W-1864	Do.	Method of Controlling Defect Orientation in Silicon Crystal Ribbon Growth	Denied
W-1865	Do.	Fluorescent Microspheres	Granted
W-1866	Do.	Electromagnetic Power Absorber	Do.
W-1867	Do.	Induced Junction Solar Cell and Method of Fabrication	Do.
AW-1868	Burroughs Corporation	Preliminary Study for a Computational Aerodynamic Design Facility	Do.
AW-1873	E. I. DuPont De Nemours & Company	Feasibility of Producing Ultra-Thin Polymeric Film	Do.

**LIST OF WAIVER PETITIONS—FINDINGS OF FACT NOT DIGESTED—Continued  
(1972 Regulations)**

<i>Waiver Case Number</i>	<i>Petitioner</i>	<i>Invention or Contract</i>	<i>Disposition</i>
W-1874	International Business Machines Corporation	Semiconductor Structure	Granted
AW-1877	Texas Instruments, Inc.	Multiple, Independently Steered Beam Study	Do.
W-1878	General Electric Company	Variable Mixer Propulsion Cycle	Do.
W-1879	Texas Instruments, Inc.	Variable Cycle Gas Turbine Engines	Do.
W-1883	SSP Products, Inc.	Screen Support Flange	Do.
AW-1884	Texas Instruments, Incorporated	CCD Arrays	Do.
W-1885	General Electric Company/ Aircraft Engine Group	Method and Apparatus for Failure Detection in Gas Turbine Engine Control System	Do.
AW-1887	RCA Corporation	Dynamics Explorer Instrument Payload Study	Do.
W-1891	Massachusetts Institute of Technology	A Charge-Flow Transistor and Instrument Embod- ing the Same	Granted <sup>1</sup>
W-1892	Do.	High Gradient Continuous Caster	Granted
W-1893	Abacus Controls, Inc.	Inverter Control System	Do.
W-1894	California Institute of Technology	Surfactant-Assisted Liquefaction of Particulate Carbonaceous Substances	Denied
W-1895	Do.	Coupling Apparatus for Ultrasonic Medical Diagnostic System	Do.
W-1898	Westinghouse Electric Corporation	D.C. Static Switch Circuit with Power Saving Feature	Granted
AW-1900	RCA Corporation	Development of a Radiation- Hard Microprocessor and Associated Devices	Do.
W-1904	California Institute of Technology	A Sewage Treatment System	Do.
W-1906	Pennwalt Corporation	Intumescent Coating Composition	Do.
AW-1907	Texas Instruments, Inc.	Low Cost Silicon Solar Array Project	Denied

<sup>1</sup> Foreign rights only.

**LIST OF WAIVER PETITIONS—FINDINGS OF FACT NOT DIGESTED—Continued  
(1972 Regulations)**

<i>Waiver Case Number</i>	<i>Petitioner</i>	<i>Invention or Contract</i>	<i>Disposition</i>
AW-1908	Texas Instruments, Inc.	Silicon Sheet Growth Development	Denied
AW-1909	RCA Corporation	Solid-State Image Sensor Development	Granted
AW-1910	The Singer Company	Spacelab Simulator (SLS)	Do.
AW-1912	National Semiconductor Corporation	Development of Radiation Hard Bipolar Linear Devices	Do.
AW-1913	Siltec Corporation	Silicon Crystal Growth Utilizing Continuous Molten Silicon Feed	Do.
AW-1915	Mechanical Technology Incorporated	Design of Hermetically Sealable Free-Piston Engine Alternator of 1 kW Capacity	Do.
AW-1918	RCA Corporation	Low Cost Silicon Solar Array Program; Large Area Silicon Sheet Task-Epitaxial Silicon Growth for Solar Cells	Do.
AW-1919	Do.	Low Cost Silicon Solar Array Program; Automated Array Assembly Task (Phase 2)	Do.
AW-1920	Do.	Low Cost Silicon Solar Array Program; Large Area Silicon Sheet Task, Die and Container Material Development	Do.
AW-1923	J. C. Schumacher Company	Low Cost Silicon Solar Array Program; Feasibility Study of a High Velocity, Continuous-Flow Reactor for the Production of Solar Grade Silicon	Do.
W-1924	California Institute of Technology	Ion Exchange Membrane	Do.
AW-1926	Horizons Research, Inc.	High Resolution Masks for Ion Milling Pores Through Substrates	Do.
W-1931	Arden Sher	Apparatus Including Effectively Intrinsic Semiconductor for Converting Radiant Energy to Electrical Energy	Do.
AW-1963	Texas Instruments, Incorporated	Fabrication, Test and Deliver Charge Coupled Devices and Associated Electronic Sub-assemblies	Do.
AW-1965	Do.	Design, Develop, Fabricate, Test, and Deliver Charge Coupled Device (CCD) Imagers	Do.

# **LIST OF WAIVER PETITIONS—FINDINGS OF FACT NOT DIGESTED (1977 Regulations)**

The Findings of Fact of the Inventions and Contributions Board for the waiver cases listed below are not digested in this booklet, since the rationale for these waiver decisions are similar to that of other decisions which already have been digested. The waiver numbers listed below that are prefixed by the letter W refer to waivers for identified inventions, and those prefixed by the letters BW (Blanket Waiver; 1966 Regulations) and AW, (Advance Waiver; 1972 and 1977 Regulations) refer to waiver to any or all reported inventions made under a contract.

Inquiries concerning the waiver cases listed below should be made to the National Aeronautics and Space Administration, Inventions and Contributions Board, Code NB-9, Washington, D.C. 20546.

<i>Waiver Case Number</i>	<i>Petitioner</i>	<i>Invention or Contract</i>	<i>Disposition</i>
W-1929	Westinghouse Electric Corporation	Monolithic Sequential Processor as for Four Quadrant Multiplier Arrays	Granted
W-1930	Do.	Method and Apparatus for Performing Matrix Multiplication or Analog Signal Correlation	Do.
AW-1940	General Electric Company	CF 6-6 High Pressure Turbine Aerodynamic Improvement Concept	Do.
AW-1941	Do.	CF-6 Front Mount Performance Improvement Concept	Do.
W-1943	International Telephone and Telegraph Corporation	Integrated Circuit Connector	Do.
W-1944	General Motors Corporation	Combustor Dam Connector	Do.
AW-1950	RCA Corporation	AlGaAs and InGaAsP LPE Heterstructure Lasers for Optical Data Processing	Do.
W-1951	University of Denver	Impedence Pneumograph and Respiration Rate Conditioner	Do.
W-1952	Do.	Heart/Breath Rate Processor	Do.
W-1953	Do.	Clock	Do.
W-1954	Do.	LCD Driver	Do.
W-1955	Do.	ECG Amplifier and Cardiotachometer Signal Conditioner	Do.
AW-1958	Texas Instruments, Inc.	Closed Cycle Process for Silicon Using a Rotary Chamber Reactor	Denied
AW-1964	National Semiconductor Corporation	Development of Radiation Hard Bipolar Linear Devices and a CMOS Memory Device	Granted
W-1967	Ohio State University Research Foundation	Simplified Pitch and Linear Perspective Changes for Aircraft Straight-in Approaches	Do.

## APPENDIX C: AVAILABILITY OF PATENT WAIVER REQUEST FORMS

As provided for by 14 CFR 1245.110 of the 1977 NASA Patent Regulations, F.R. 57449-57454, (see page 1351), waiver forms may be used in requesting waiver of domestic and/or foreign rights. Waiver of rights may be requested under any applicable section of the Regulations even though an earlier request under a different section was not made or if made it was not granted.

**Advance Waiver of Domestic Rights.**—Use NASA Form 1473 Sep 78 to request advance waiver of domestic rights to any or to all of the inventions that may be made under a NASA contract pursuant to section 1245.104 of the NASA Patent Waiver Regulations. Such request may be made prior to the execution of the contract or within thirty (30) days thereafter. (See pages c-3 through c-5 for facsimile.)

**Waiver of Domestic Rights to an Identified Invention.**—Use NASA Form 1474 Sep 78 to request waiver of domestic rights to a reported invention pursuant to section 1245.105 of the NASA Patent Waiver Regulations. A separate petition must be submitted for each identified invention. (See pages c-7 through c-10 for facsimile.)

**Waiver of Foreign Rights.**—Use NASA Form 1475 Sep 78 to request waiver of foreign rights to any or all inventions made under a NASA contract pursuant to section 1245.106 of the NASA Patent Waiver Regulations. This form may accompany either of the above forms in conjunction with a petition for waiver of domestic rights or it may be submitted independently thereof for an identified invention. (See pages c-11 and c-12 for facsimile.)

These forms, designed to elicit the information necessary for proper consideration of a request for waiver by the Inventions and Contributions Board, NASA, may be obtained by petitioners from NASA installation contracting officers, installation patent counsels, and from the Inventions and Contributions Board, Code NB-9, Washington, D.C. 20546.

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**Petition for Advance Waiver of Domestic  
Rights Under Section 1245.104 of the  
NASA Patent Waiver Regulations (1977)**  
(See Instructions on Reverse)

Form Approved  
O.M.B. No. 104-R0062

TO BE COMPLETED BY NASA WAIVER NO.
---------------------------------------

Title of Contract or Proposal \_\_\_\_\_

RFP No. \_\_\_\_\_, Contract No. and Date (If executed) \_\_\_\_\_

The \_\_\_\_\_  
(Name and address of Petitioner)

does hereby petition the Administrator of the National Aeronautics and Space Administration for waiver of domestic rights of the United States of America to any invention(s) that may be made in the performance of work under the above-identified contract. It is understood that any waiver of rights shall be subject to the conditions set forth in the NASA Patent Waiver Regulations (1977) and the Instrument of Waiver.

In support of this petition, the following factual information is submitted (Where appropriate, "Proposal" may be substituted for "Contract."):

(a) Briefly describe the work to be performed under the contract. (Also attach a copy of the work statement.)

(b) In your view, what is the principal purpose of the contract?

(c) What is the dollar amount, and period of performance of the contract?

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(d) Is the contract:

(i) Related to any Government program known to Petitioner for creating, developing, or improving products, processes, or methods intended for commercial use, or use by the general public or a segment thereof? (If yes, explain.)

(ii) In any way supported by another Government agency? (If yes, identify the agency and its participation in the contract.)

(e) Is the Petitioner aware of any governmental regulations which require or which might require the use of the contract subject matter by the general public or a segment thereof? (If yes, explain.)

(f) Does the work under the contract require an exploration into fields which concern the public health, public safety or public welfare (for example, the development of drugs, medical or safety instruments, anti-pollution devices or such other products that may have a bearing on health, safety or welfare of the general public)? (If yes, explain.)



**INSTRUCTIONS ON PREPARING PETITION FOR WAIVER FORMS FOR WAIVER  
OF RIGHTS UNDER THE NASA PATENT WAIVER REGULATIONS (1977)**

The NASA Patent Waiver Regulations (1977) were published on November 3, 1977 in 42 Federal Register 57449-57454. These regulations implement Section 305(f) of the National Aeronautics and Space Act of 1958, as amended, 42 U.S.C. 2457(f).

NASA petition for waiver forms (*NASA Forms 1473, 1474 and 1475, as revised*) are designated to elicit information that is deemed necessary for the NASA Inventions and Contributions Board to make its findings and recommendations based on criteria set out in appropriate sections of the NASA Patent Waiver Regulations (1977). A petitioner, therefore, should furnish the Board facts rather than summary statements. Any arguments or additional information other than that called for in the forms may be submitted, and brochures, pamphlets, etc., may be attached as exhibits. Petition forms should be submitted in duplicate; however, only one set of exhibits is necessary.

Petitions for advance waiver prior to contract execution must be submitted directly to the Contracting Officer. All other petitions shall be submitted to the National Aeronautics and Space Administration, Inventions and Contributions Board, Washington, DC 20546.

**ADVANCE WAIVER OF DOMESTIC RIGHTS.**—Use NASA Form 1473 to request advance waiver of domestic rights to any or to all of the inventions that may be made under a NASA contract pursuant to Section 1245.104 of the NASA Patent Waiver Regulations (1977). Such request may be made prior to the execution of the contract or within thirty (30) days thereafter.

**WAIVER OF DOMESTIC RIGHTS TO AN IDENTIFIED INVENTION.**—Use NASA Form 1474 to request waiver of domestic rights to a reported invention pursuant to Section 1245.105 of the NASA Patent Waiver Regulations (1977). A separate petition must be submitted for each identified invention.

**WAIVER OF FOREIGN RIGHTS.**—Use NASA Form 1475 to request waiver of foreign rights to any or all inventions made under a NASA contract pursuant to Section 1245.106 of the NASA Patent Waiver Regulations (1977). This form may accompany either of the above forms (*NASA Form 1474 or NASA Form 1475*) in conjunction with a petition for waiver of domestic rights or it may be submitted independently thereof for an identified invention.

- (g) Is the contract for services of the Petitioner for (i) the operation of a Government-owned research or production facility, or (ii) coordinating and directing the work of others? *(If yes, explain.)*
- (h) What is the field of science or technology of the work of the contract? Also briefly explain the relationship of the work to be performed under the contract to this field.
- (1) Has the Government been the principal developer of this field? *(If yes, answer (i) and (ii).)*
- (i) Briefly describe the development and growth of this field.
- (ii) Would the acquisition of exclusive rights to any inventions that might result from this contract be likely to place Petitioner in a preferred or dominant position in this field? *(Explain.)*
- (i) Briefly describe the Petitioner's technical competence in the field of technology of the contract in terms of prior experience, know-how, and patent position.
- (1) Does the Petitioner have an established non-governmental commercial position in this field or in an area directly related thereto? *(If yes, briefly discuss in terms of selling goods or providing services in such field or area outside of sales to the U.S. Government.)*
- (j) Does the Petitioner presently intend to assign rights in the inventions which arise under the contract to any party who is not a petitioner named hereon? *(If yes, identify such party and explain the Petitioner's relationship thereto.)*

Where the Petitioner intends to qualify for waiver under Subsection 1245.104(b)(2) of the NASA Patent Waiver Regulations (1977), he must establish that exceptional circumstances and/or special situations exist such that the public interest would best be served by waiver of rights. Complete information relating thereto should be provided as an attachment to this form.

State below the name, address and telephone number of the person to whom correspondence is to be directed:

Respectfully submitted,

\_\_\_\_\_  
*(Signature)*

Date submitted to NASA \_\_\_\_\_

\_\_\_\_\_  
*(Name and title of authorized representative. Please print)*

NASA FORM 1473 SEP 78 PREVIOUS EDITION IS OBSOLETE.  
(PAGE 2 OF 2 PAGES)





Petition for Waiver of Domestic Rights  
to an Identified Invention Under  
Section 1245.105 of the NASA Patent  
Waiver Regulations (1977)

(See Instructions on Reverse)

Form Approved  
O.M.B. No. 104-R0062

TO BE COMPLETED BY NASA
WAIVER NO.
NASA CASE NO.

Title of Invention \_\_\_\_\_

Date Reported to NASA \_\_\_\_\_ Petitioner's Docket No. \_\_\_\_\_

U.S. Patent Application S.N. \_\_\_\_\_ Date Filed \_\_\_\_\_ Contract No. \_\_\_\_\_

Inventor(s) \_\_\_\_\_

The \_\_\_\_\_  
(Name and address of Petitioner)

does hereby petition the Administrator of the National Aeronautics and Space Administration for waiver of domestic rights of the United States of America to the above-identified and reported invention. It is understood that any waiver of rights shall be subject to the conditions set forth in the NASA Patent Waiver Regulations (1977) and in the Instrument of Waiver.

In support of this petition, the following factual information is submitted.

GENERAL

- (a) List the dates of any public disclosure, printed release, publication, public use and/or sale or offer for sale of the invention which occurred or which might be expected to occur prior to the filing of a U.S. patent application. Attach a copy of any such document, if available.
- (b) Attach a copy of the contract work statement or briefly describe the work of the contract under which the invention was made.  
(Do not submit the entire contract.)

INVENTION

- (a) Briefly describe the invention. Also attach a copy of the invention disclosure, or patent application.
- (b) Is the invention related to any governmental program known to the Petitioner for creating, developing, or improving products, processes or methods for use by the general public or a segment thereof? (If yes, explain.)
- (c) Is the Petitioner aware of any governmental regulations which require or which might require use of the invention by the general public? (If yes, explain.)

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**INSTRUCTIONS ON PREPARING PETITION FOR WAIVER FORMS FOR WAIVER  
OF RIGHTS UNDER THE NASA PATENT WAIVER REGULATIONS (1977)**

The NASA Patent Waiver Regulations (1977) were published on November 3, 1977 in 42 Federal Register 57449-57454. These regulations implemented Section 305(f) of the National Aeronautics and Space Act of 1958, as amended, 42 U.S.C. 2457(f).

NASA petition for waiver forms (*NASA Forms 1473, 1474 and 1475, as revised*) are designated to elicit information that is deemed necessary for the NASA Inventions and Contributions Board to make its findings and recommendations based on criteria set out in appropriate sections of the NASA Patent Waiver Regulations (1977). A petitioner, therefore, should furnish the Board facts rather than summary statements. Any arguments or additional information other than that called for in the forms may be submitted, and brochures, pamphlets, etc., may be attached as exhibits. Petition forms should be submitted in duplicate; however, only one set of exhibits is necessary.

Petitions for advance waiver prior to contract execution must be submitted directly to the Contracting Officer. All other petitions shall be submitted to the National Aeronautics and Space Administration, Inventions and Contributions Board, Washington, DC 20546.

**ADVANCE WAIVER OF DOMESTIC RIGHTS.**—Use NASA Form 1473 to request advance waiver of domestic rights to any or to all of the inventions that may be made under a NASA contract pursuant to Section 1245.104 of the NASA Patent Waiver Regulations (1977). Such request may be made prior to the execution of the contract or within thirty (30) days thereafter.

**WAIVER OF DOMESTIC RIGHTS TO AN IDENTIFIED INVENTION.**—Use NASA Form 1474 to request waiver of domestic rights to a reported invention pursuant to Section 1245.105 of the NASA Patent Waiver Regulations (1977). A separate petition must be submitted for each identified invention.

**WAIVER OF FOREIGN RIGHTS.**—Use NASA Form 1475 to request waiver of foreign rights to any or all inventions made under a NASA contract pursuant to Section 1245.106 of the NASA Patent Waiver Regulations (1977). This form may accompany either of the above forms (*NASA Form 1473 or NASA Form 1475*) in conjunction with a petition for waiver of domestic rights or it may be submitted independently thereof for an identified invention.

- (d) In what field of science or technology would the invention be classified? Also briefly explain how the invention is related to this field. *(This field should reflect the primary technology or scientific discipline of the invention.)*

(1) Has the Government been the principal developer of this field? *(If yes, answer (i) and (ii).)*

(i) Briefly describe the development and growth of this field.

(ii) Would the acquisition of exclusive rights in the invention be likely to place the Petitioner in a preferred or dominant position in this field? *(Explain.)*

(e) Does the invention concern the public health, public safety or public welfare? *(If yes, explain.) (Discuss in terms of probable use as drugs, medical instruments, safety equipment, anti-pollution devices or other such products that may have a bearing on the health, safety, or welfare of the general public.)*

#### DEVELOPMENT AND COMMERCIALIZATION PLANS AND INTENTIONS

(a) Has the invention been incorporated in a commercial product, process or service *(i.e., for non-governmental use)*? *(If yes, identify the product, process or service and its applications. If no, identify those commercial applications which the Petitioner intends to pursue, and briefly discuss how the invention will be used.)*

(b) If the invention is not fully developed for commercial application, briefly explain what further development is necessary to make it suitable for commercial application.

(c) What are the Petitioner's specific plans and intentions to achieve commercial application? Also indicate the resources presently available or to be acquired by the Petitioner to implement this plan. *(Commercial application of inventions usually require the use of resources. Discuss what resources or technology the Petitioner expects to use to further develop and promote commercial applications of the invention.)*

(1) Does the Petitioner intend to market and/or license the invention itself? *(If yes, briefly describe Petitioner's marketing/licensing capability.)*

(i) Indicate below when the invention is likely to be made available for commercial use.

Year likely to occur \_\_\_\_\_; Probability of use \_\_\_\_\_%

(d) Is the Petitioner aware of any plans of others, including those of any Government agency, to fund further development of the invention or otherwise make it available to the public? *(If yes, explain.)*

(e) Does the Petitioner presently intend to assign rights in the invention to any party who is not a petitioner named herein? *(If yes, (1) Identify such party, (2) Explain the petitioner's relationship thereto, and (3) What are the Assignee's plans and intentions to achieve commercial application of the invention.)*

Where Petitioner intends to qualify for waiver under Section 1245.105(c) of the NASA Patent Waiver Regulations (1977), he must establish that waiver is a necessary incentive to call forth risk capital and expense to bring the invention to the point of practical or commercial application, or that the Government's contribution to the invention is small compared to the Petitioner. Complete information relating thereto including Petitioner's plans for development and commercialization, and the resources to be committed therefor should be provided below or as an attachment to this form.

State below the name, address and telephone number of the person to whom correspondence is to be directed:

Respectfully submitted,

\_\_\_\_\_  
(Signature)

Date submitted to NASA \_\_\_\_\_

\_\_\_\_\_  
(Name and title of authorized representative. Please print)

**Petition for Waiver of Foreign Rights  
Under Section 1245.106 of the NASA  
Patent Waiver Regulations (1977)**

(See Instructions on Reverse)

Form Approved  
O.M.B. No. 104-R0062

<b>TO BE COMPLETED BY NASA</b>
WAIVER NO. _____
NASA CASE NO. _____

Title of Invention, Contract or RFP \_\_\_\_\_

U.S. Patent Application S.N. \_\_\_\_\_ Date Filed \_\_\_\_\_

RFP or Contract No. \_\_\_\_\_ Petitioner's Docket No. \_\_\_\_\_

The \_\_\_\_\_  
(Name and address of Petitioner)

does hereby petition the Administrator of the National Aeronautics and Space Administration for waiver of foreign rights to ☐ any invention(s) made in the performance of work under the above-identified RFP or contract pursuant to Section 1245.106(a) of the NASA Patent Waiver Regulations (1977), or to ☐ the above-identified invention pursuant to Section 1245.106(b) of said Regulations (*Check one*). It is understood that any waiver of rights shall be subject to the conditions set forth in the NASA Patent Waiver Regulations (1977) and the Instrument of Waiver. The information below is submitted in support of this petition.

- (1) List the countries in which Petitioner desires waiver of rights.
- (2) Is the Petitioner engaged in the above countries in the sale of products and/or services that are related to the field of technology of the contract or invention? (*If yes, explain.*)
- (3) What are the Petitioner's plans to practice and/or license the invention(s) in the countries listed above? State also if the Petitioner intends to manufacture the invention(s) abroad.
- (4) Discuss how waiver of foreign rights would serve the economic interest of the United States.

If the waiver request is for a specific invention, answer the following questions in a separate attachment to this form.

- (a) Briefly describe the invention. Also attach an invention disclosure if it is not already of record in the Inventions and Contributions Board.
- (b) Has a petition for waiver of domestic rights in the above-identified invention been made? State, if known, the waiver number assigned to such a petition.
- (c) List the dates of any known public disclosure, printed release, publication, public use and/or sale or offer for sale of the invention which has occurred or which might be expected to occur prior to the filing of a U.S. patent application. Attach a copy of any such document, if available. Also identify any report submitted to the Government which may have disclosed the invention.

State below the name, address and telephone number of the person to whom correspondence is to be directed:

Respectfully submitted,

\_\_\_\_\_  
(Signature)

Date submitted to NASA \_\_\_\_\_

\_\_\_\_\_  
(Name and title of authorized representative. Please print)

NASA FORM 1475 SEP 78 PREVIOUS EDITION IS OBSOLETE.



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